HP Professional

AN INDEPENDENT PUBLICATION FOR USERS OF HP COMPUTERS ■ VOL.3 ■ NO.9 ■ $4.00

SEPTEMBER 1989

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- MMS Improves Control Of Factory Floor
- Insights Into COBOL85

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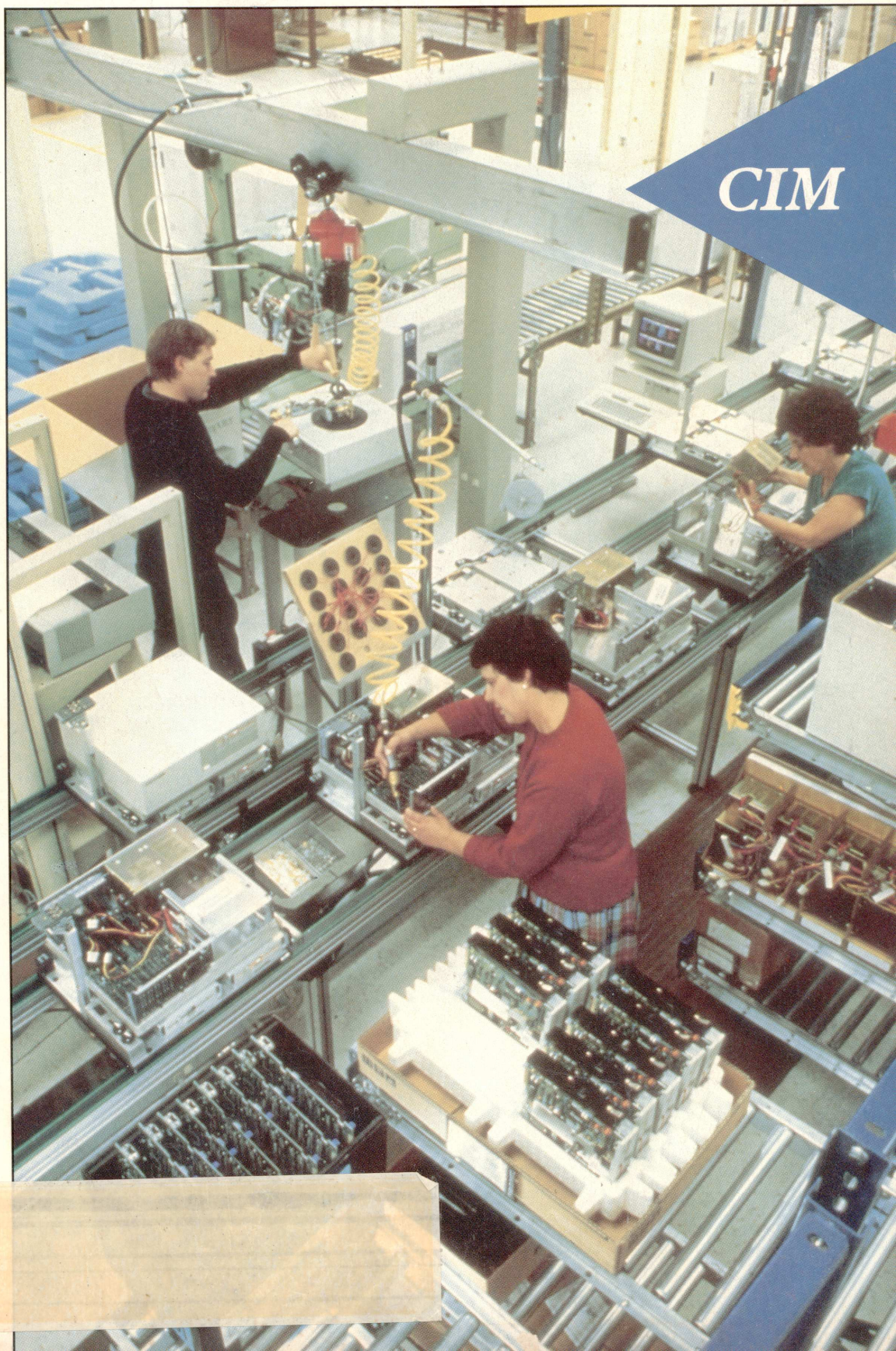

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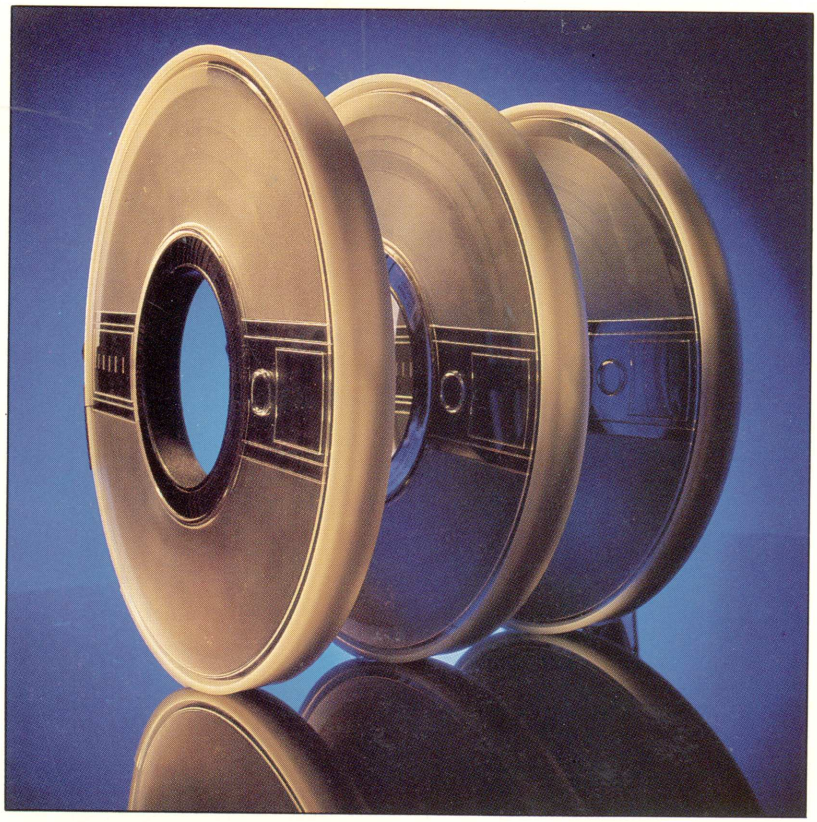

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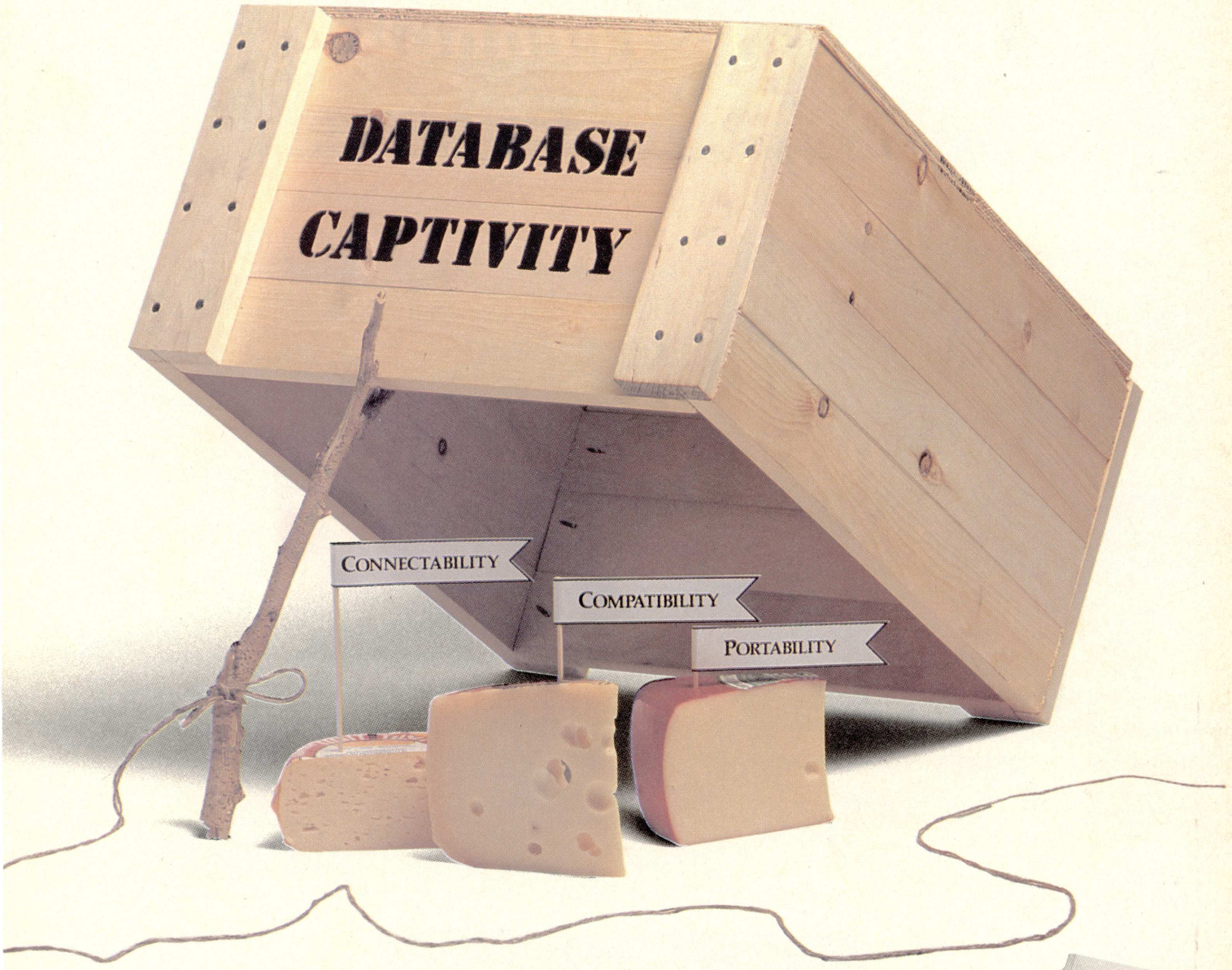

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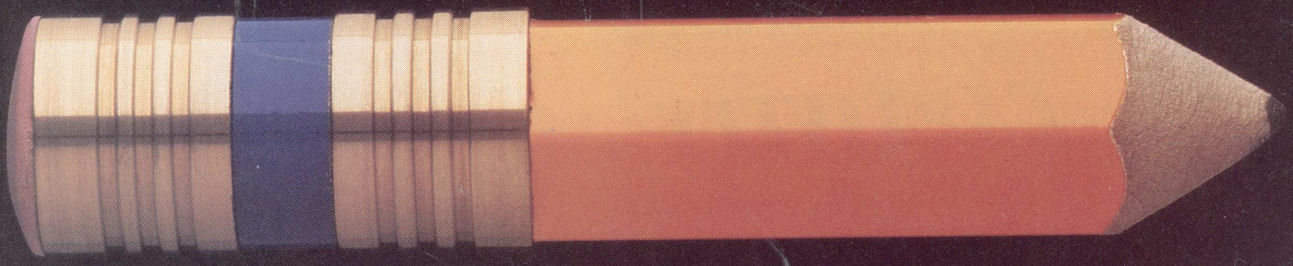

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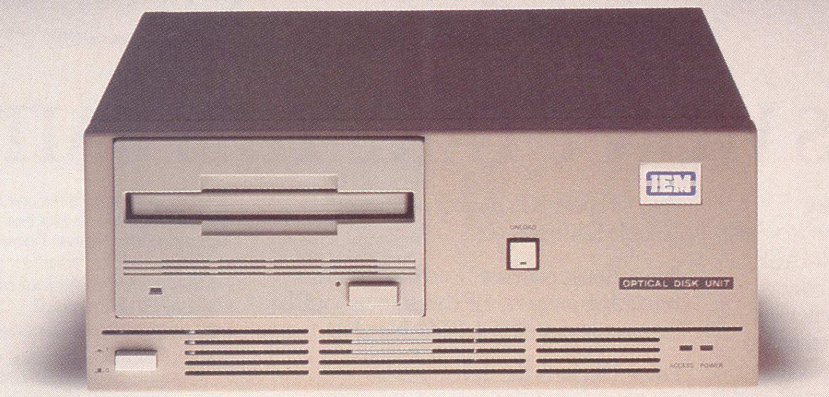

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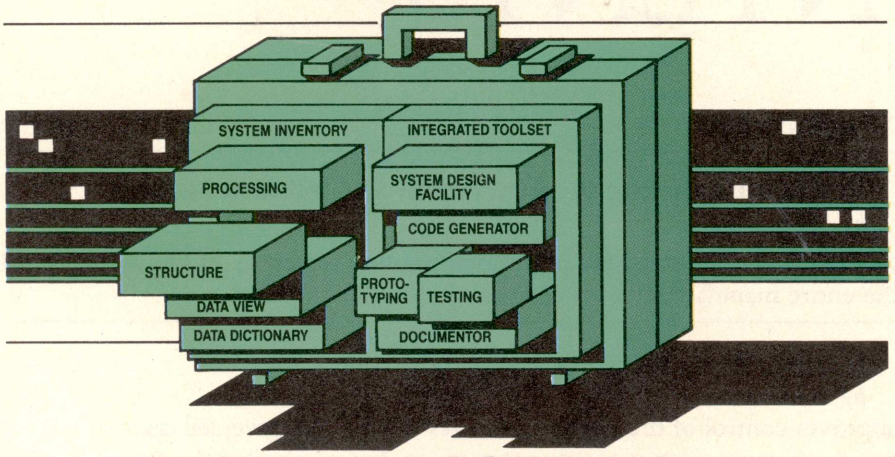

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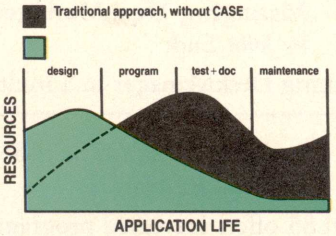

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CIRCLE 116 ON READER CARD

The Boys Of Summer

One of the highlights of covering the HP market is attending the company's annual three-day CIMinar, a special editorial seminar that brings together editors from the trade press, HP brass, manufacturing executives, industry analysts, plus an array of academians and authors who track and report on the state of U.S. manufacturing.

Now in its sixth year, the summer event always is held at a resort or country club where informality is the rule and business attire is strictly forbidden. The setting for this year's CIMinar was the Silverado Country Club, nestled in the lush wine country of Napa, CA (now you know why it's a yearly highlight).

But CIMinar is serious business to Hewlett-Packard. Manufacturing is HP's No. 1 market, accounting for one-half of the company's annual sales. Serious business, indeed — not only for HP, but for every American manufacturer concerned with global competition in the '90s.

When John Young, HP's president and chief executive officer, talks about the state of U.S. manufacturing, he doesn't mince words, even in the casual atmosphere of a country club. Opening the CIMinar, Young pointed out that the United States has invested less in manufacturing in the 1980s than in any other period in U.S. history. He mentioned that since World War II, two-thirds of economic growth in the U.S. can be attributed to "better technology." He stressed that there are no "owners" today, only "traders," and that the greatest challenges we face today aren't technological, but sociological. That is, the U.S. again must recognize the importance of manufacturing.

The purpose of CIMinar isn't so much a three-day promotion of HP's computer integrated manufacturing products and strategy, but an educational effort by the company to make the trade press aware of the overall importance of manufacturing to the U.S. economy. Yes, there was some Japan bashing (Korea and Congress, too), but the scope of the event focused on what the U.S. must do to compete against foreign competition in a global marketplace.

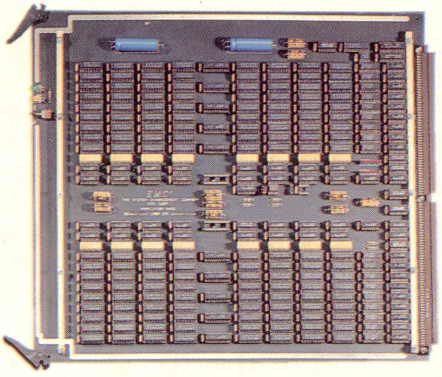
And the key word mentioned by almost every speaker and repeated at every social event was "integration." We were told that we are now in the midst of a CIM evolution, rather than a revolution; that the technology is sound, and now the focus is centered on tieing it all together to connect the factory floor to the executive suite.

The challenge today isn't so much developing and refining the automation of industry; rather, the focus is to "integrate" existing multivendor systems to incorporate all the elements necessary to unite every function of a company. The end result? An integrated approach to plan and manufacture products that will compete in price, performance and quality in the global marketplace.

John Young said that the U.S. has always been the long ball hitter, but now foreigners are doing everything they can just to get on base, any way they can — singles, bunts. . . . In order for U.S. manufacturing to get back into the game, those in the know look at integration as a fastball that has home run written all over it.

Tom Halligan

HOW TO GET EVERYTHING OUT OF A SPECTRUM THAT HP PUTS IN.



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ARISTALK

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By now, many of you have had a chance to try out our new bulletin board, ARIS/BB. Or, maybe you were unable to log on because of improper terminal settings or, I shudder to say, our system was down.

Actually, there was a two-week period when our ARIS phone lines were down because our new LAT system had some bugs to be ironed out. Also, our air conditioning went on the blink, and the temperature in the computer room rose above 90 degrees. We had no choice but to shut down the computers until a motor was replaced in the cooling system. A day or two later, a construction worker accidentally knocked down electrical wires. The repair required a power shutdown in our building. That's our excuse. What's yours? Maybe you have a few questions.

What computer does the BBS run on?

A DEC VAXcluster.

What terminal type should I use?

VT100/VT200 (ANSI mode).

I don't have a VT100 emulation capability on my Vectra.

There are a number of terminal emulation software products on the market. Some are even public domain. HP's AdvanceLink is a terminal program that supports ANSI standard mode.

After the modems connect, I wait and wait, and nothing happens.

Once the modems CONNECT, hit your return key two or three times to wake things up. Too few or no returns will cause a disconnect.

What does ARIS have to offer beside the Message Center?

Did you ever need an article you read several months ago, but couldn't remember what issue it was in? The Cumulative Index (44 from the Master Menu) can help you locate articles. Don't worry if you can't remember the title. You can Search by Title by entering only one word and you'll get a list of titles where that word appears. If you have a favorite author, look up his articles under Search by Author. Next to the titles, you'll see a sequence of numbers that tells you the volume, number and page of the article. For example, 3.5.30 is Vol. 3, No. 5, page 30. If you don't have the issue you need, order it through Back Issues (22 from the Master Menu).

The Cumulative Index is just one feature of ARIS. *Figure 1* shows the actual ARIS Master Menu, so you can see the many options available to you.

Show off your expertise. Contribute your knowledge to the Message Center. People are waiting to hear from you.

Remember, ARIS is free to subscribers. All it costs is your phone call. And we have four locations, so choose the number nearest you. —*Anne Schrauger*

ARIS Master Menu

```
** Product Information **
11 - Index by Product/Vendor Name

** Subscription Information **
21 - Change Mailing Address
22 - Order Back Issues
23 - Order Books Published by
Professional Press
24 - Subscribe to VAX PROFESSIONAL
25 - Reprint Information

** Writer's Guide **
31 - Editorial Calendar
32 - Author's Guidelines

** Reader Forum **
41 - Message Center
+42 - User Group Forum
43 - Programs to Download
44 - Cum Index of Articles
45 - Letters to Editor
+46 - Text Retrieval

** User's Guide **
51 - Dear SYSOP
52 - ARIS News
53 - Publication News & Corrections

54 - New Publication

(+ = new feature coming soon)
99 - to exit ARIS
Choose your selection :
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Figure 1: Many options are available to the ARIS/BB user.

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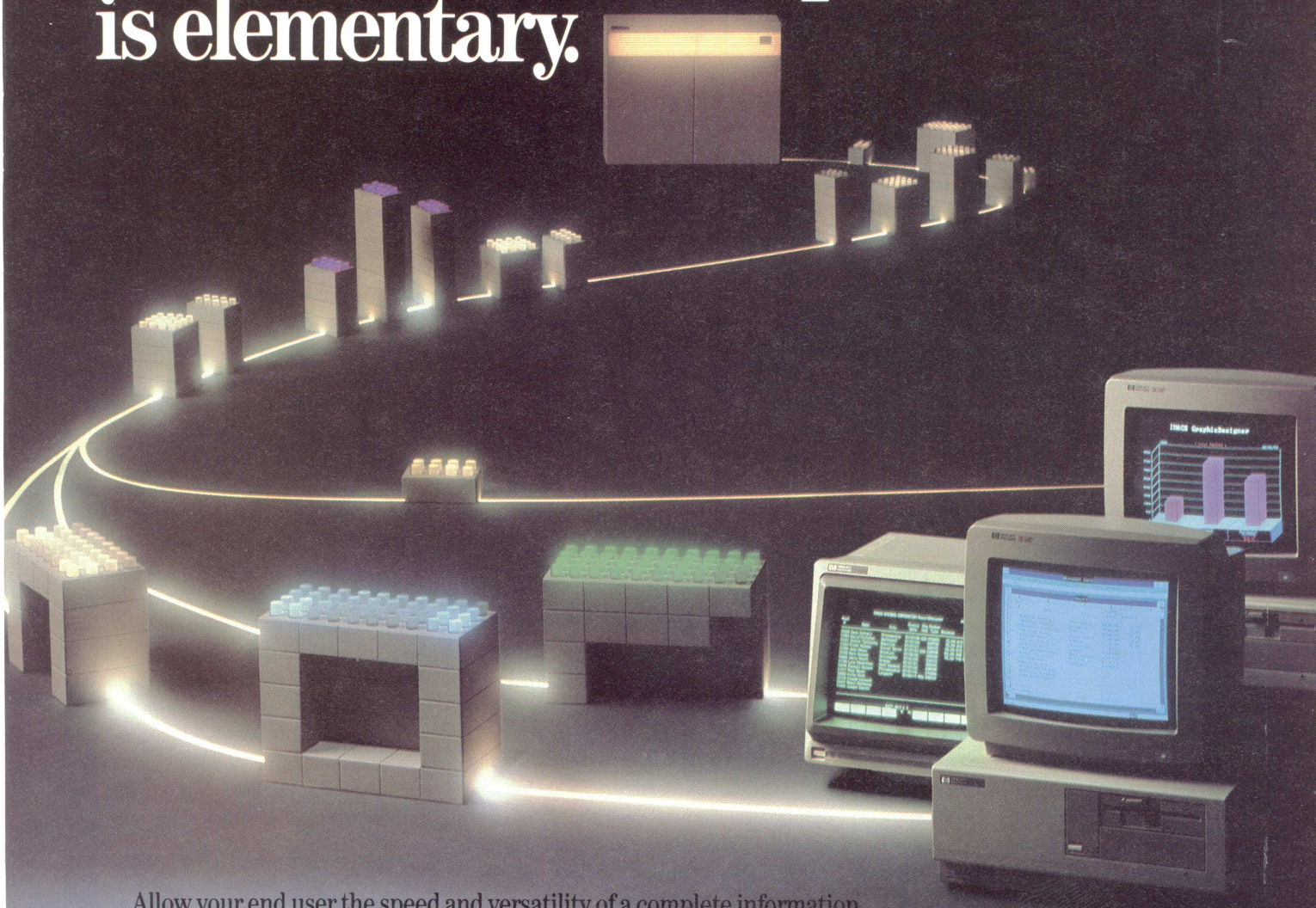

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CIRCLE 118 ON READER CARD

INDUSTRY WATCH

Peggy King

The Long View

About five years ago, I was involved with a team that was supposed to deliver automated production lines to a corporation that desperately needed to cut manufacturing costs. When I joined the project, I was told the month and year when the first factory was slated to operate. When I left a year and a half later, I had yet to see the prototype assembly line do more than move pallets from one point to another.

This company isn't alone in having invested huge resources to implement CIM in hopes of a very quick return on investment. Nor is this the only CIM project not to proceed as planned. A piecemeal implementation of automation can end up costing a company more than it saves when production workers are replaced by the more highly paid knowledge workers needed to maintain computers and other machinery.

If CIM is to provide the tremendous productivity gains needed to keep U.S. factories competitive in the 21st century, funding for long range basic research is essential. Few companies have the funds and the insight to invest in this kind of research. However, HP and Lockheed are two companies that recognize the bonuses of such a research center. Both companies have allocated funds to support the DesignWorld project at Stanford University that eventually will combine computers, intelligent robots, object-oriented databases with inference capabilities and a declarative language for representing manufacturing and design concepts.

DesignWorld is set apart from "quick fix" CIM by its timetable and its approach to automation. While many companies undertake CIM expecting a payoff in a year or two, DesignWorld researchers are estimating that it will take seven to 10 years to create the kind of automated engineering system that can manufacture a portable compact disc player or similar electromechanical device.

Most project teams are dominated by software engineers with the manufacturing experts called in at review time and for occasional consulting. DesignWorld involves domain experts from the onset, and the ratio of electrical and mechanical engineers to software engineers will increase once the declarative interface language has been developed.

The diagram in *Figure 1* shows digital circuits in the foreground and electromechanical systems in the background. The Helios project at Stanford focused on automating the design of digital circuits providing the initial step in the process. The next step toward total automation is to automate the design of analog circuits and finally the mechanical parts of the device to be manufactured.

Regardless of whether the part being designed is a digital circuit, an analog circuit or a mechanical part, the declarative language (Knowledge Interface Format or KIF) is used to build the fundamental models that represent real devices. In early stages the models will be built "by hand," but eventually they'll be generated through an interface between the KIF language and a computer-aided design (CAD) system.

The eventual goal of the DesignWorld project is to automate the repair as well as the manufacture of devices. As a first step toward automated maintenance, the models for the devices will include information about how to repair circuitry. The repair of physical breakages or defects in a system presents an even greater challenge for an intelligent design system. An expert system capable of enabling devices to repair themselves requires rules for discovering defects and rules to decide whether a defective part should be repaired or replaced.

To date, most commercial projects have automated only the manufacturing stage of a product's lifecycle. DesignWorld goes beyond manufacturing to encompass design for manufacturability on the front end and design for maintainability on the back end. The project combines the expertise of AI researchers, mechanical engineers, circuit designers and database architects to provide the interdisciplinary mix that leads to unexpected discoveries.

Hewlett-Packard and other companies that invest in basic research are looking at technologies that won't become commercially feasible until the next century. Collaborative projects such as DesignWorld benefit many manufacturing efforts both within and outside the sponsoring corporations. Thanks to comprehensive, long-term CIM research, factories of the future may be to able implement CIM in a hurry.

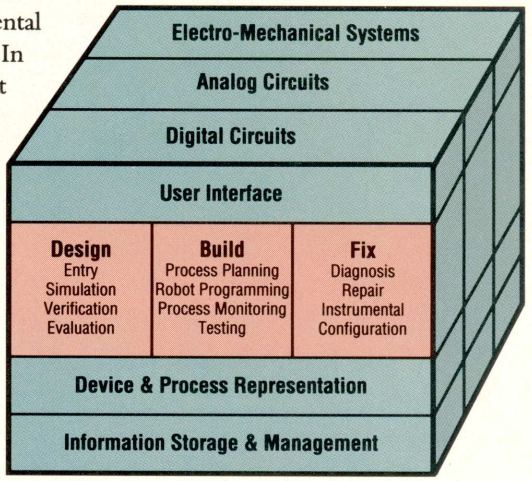

Figure 1: DesignWorld

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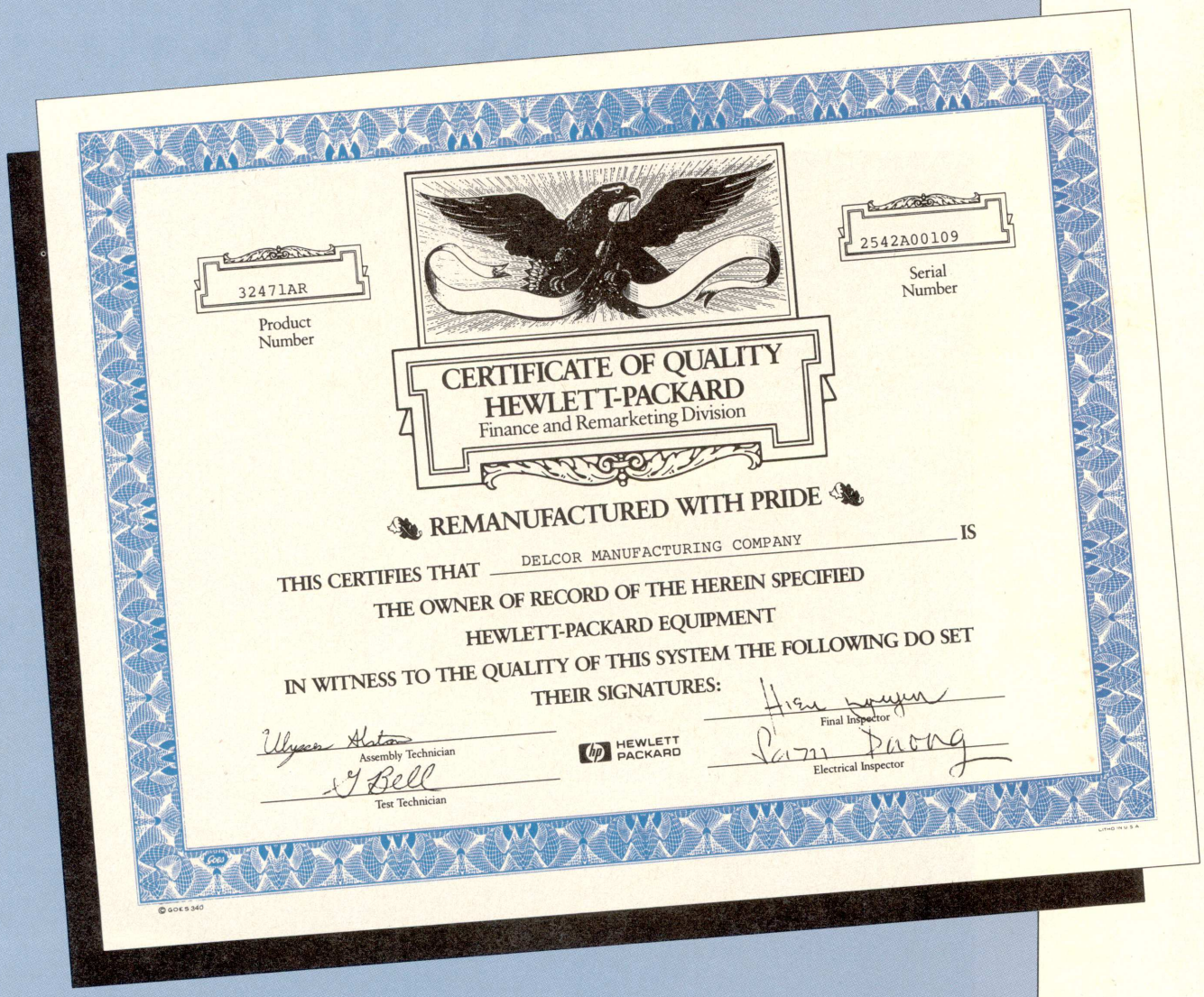
Who says you can't improve on a good thing?



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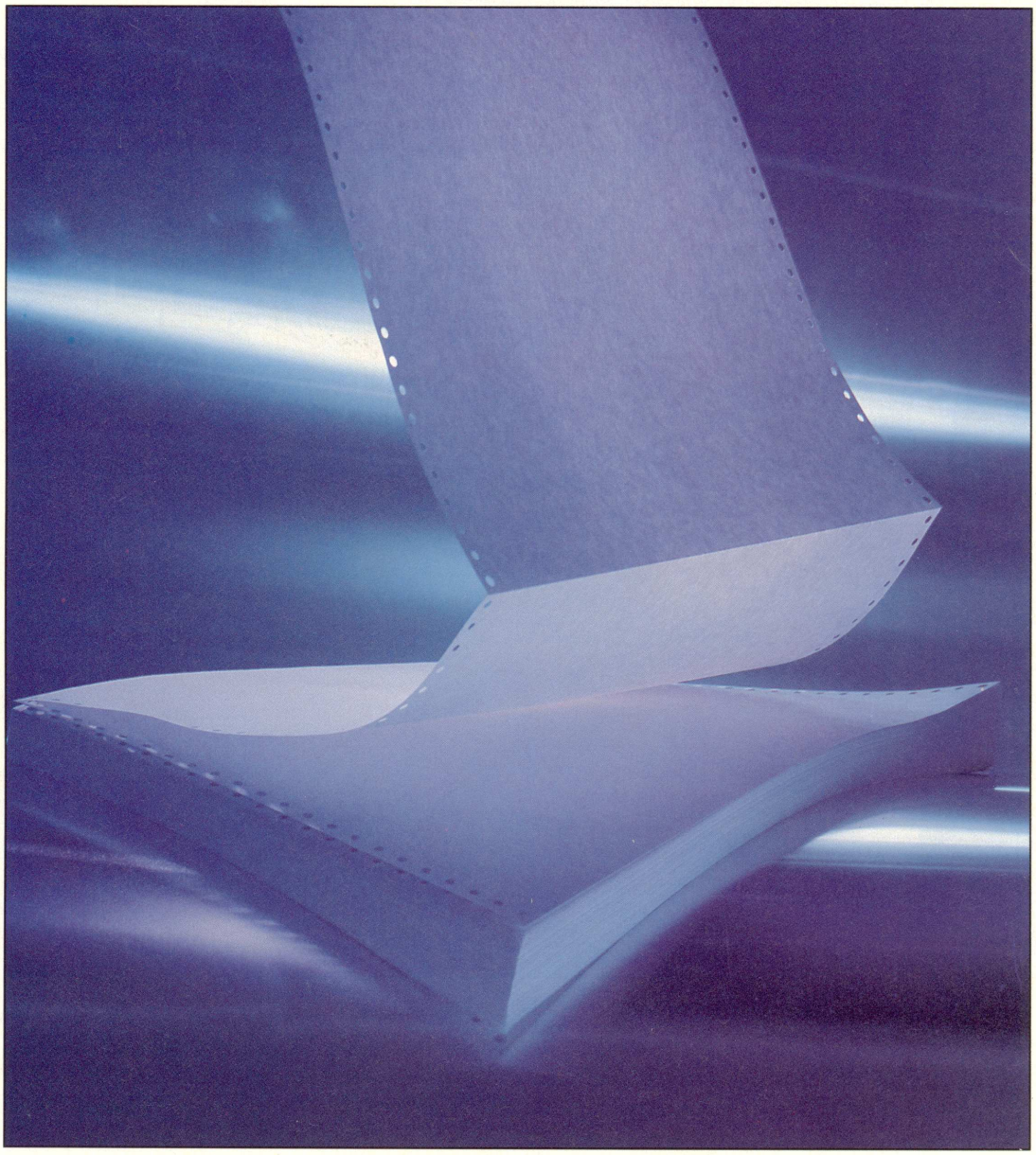

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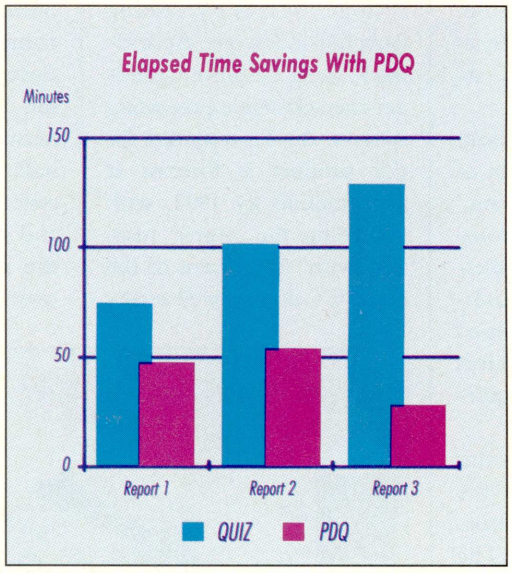

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CIRCLE 238 ON READER CARD

European Conference Marks Significant Trends

'Signposting The Nineties'

The 1989 Annual Summer Conference of the HP Computer Users Association, recently held in Brighton, England, had some differences this year, starting with the attendance.

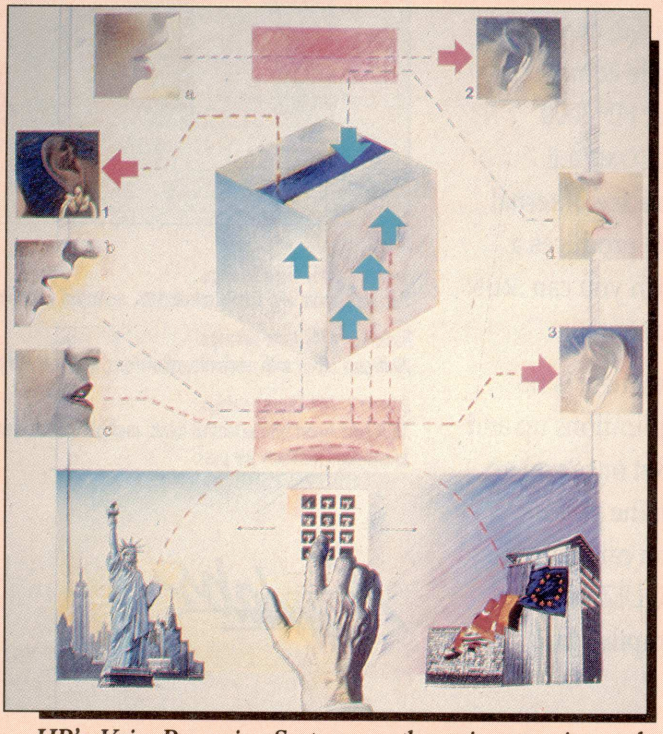
"Attendance was up from previous years, but more of the visitors were 'walk-ins,' paying an entry fee and coming for the day," said spokesman, Peter Brearley. "Exhibitors however were impressed with the calibre of the visitors and the quality of the enquiries," he added.

What is certain is that this annual event is one of the largest of its kind in Europe. The theme "Signposting The Nineties," was particularly relevant in view of the big changes coming up in Europe...1992 and all that.

Richard Worral, conference chairman noted, "We seem to be arriving at a crossroads in computing. We are seeing an increased emphasis on Open Systems and standards, possibly at the expense of proprietary systems. We shall see whether suppliers will open the "Pandora Box."

Hewlett-Packard Ltd's booth dominated the main hall and without doubt the most interesting exhibit was HP's new voice processing system currently being launched in Europe. According to Peter Dunmore, product manager voice processing systems, the Euro market for this product is forecast at $300 million by 1992, with UK being the largest market with 20 percent of the total. It's already well established in the U.S.

HP also used the show for the world launch of its Sony-developed Erasable Optical Disc Drive with a formatted capacity of 650 MB. This is seen as a high-speed alternate to tape for direct access secondary storage (DASS). The company also introduced to Europe its Lanprobe system for testing and measuring networks. Ideally, this is installed permanently in the system and can predict faults and watch trends. HP gained this system when they took over Eon recently in the U.S.



HP's Voice Processing System was the major attraction at the 1989 Annual Summer Conference in Brighton, England.

According to HP's Michael Hart, security is fast becoming a top priority in Europe as more company data is stored in comprehensive databanks. It's possible, he says, that the EEC could enact legislation in 1992, largely to protect shareholders interests. There's sharp growth in security firms in the industry and HP is introducing two services, HP Safeguard and HP Security to European users.

OCS, exhibiting through its UK distributor, Wick Hill, introduced OCS/Librarian. This is a security system designed to fit between the HP software and the user.

OCS will be announcing a new product, a knowledge-based system for retrieving information in the event of system breakdown. It contains built-in knowledge that obviates the need for a highly-qualified system manager to be in attendance all the time.

Mighty Keys, the French company, displayed its new Sesame 0905XL version. According to Ingrid de Monte, it provides a menu-driven interface and it has new features for network protection and automatically updates the personal password. Many features formerly definable at system level now are definable by the user. Also, the

documentation is vastly improved.

Leasing of equipment is on a rise in Europe, according to Mandie Wilkinson, of Captial For Computers, (Abingdon, Oxfordshire). Wilkinson points out that this is a cost effective way of upgrading computer subsystems as the technology changes. Typical lease agreements run for three to five years in Europe, but are shorter in the U.S. where leasing and hire purchase are more advanced.

Fast-changing technology is also an explanation for the rapid growth in remarketing companies. For example, Oceonics claims to be able to offer savings of 30 to 50 percent on remarketed HP equipment, often with major delivery time saving as well. The company says it's on the way to providing worldwide coverage and is active in the UK.

HP, incidentally, says its leasing and remarketing business in Europe has mushroomed recently to $200 million a year from nothing 10 years ago. Paul Valler, HP's general manager of the company's leasing program, says IBM lessors have struggled to diversify into non-IBM products. HP has been a prime target. But the company has adopted a policy of excluding third parties, because it believes it can almost always offer better terms. A key to this is that HP leasing, renting and remarketing activities are fully integrated — often across national boundaries.

From Hi-COMP Hinrich GmbH, there was a world launch of native mode versions of HIBACK/XL and DBTUNE/XL. Uwe Hinrichs said these represented a 60 percent speed improvement over the current C-mode versions.

"With HIBACK/XL there's a backup product in the market faster than HP-Store, with the added benefit of data compression up to 70 percent," noted Hinrichs. "All functions including data integrity check, network capabilities and unattended operation remain within the product."

Hinrichs said that the network approach is becoming more important and this is the line the company is following. UNIX system versions will be available soon. He feels that there's a need for all software specialists to become broader based as CAD/CAM merges into CAE and engineering programs link with office data management systems.

Alex Dengo of Adager agrees that HP has considerably broadened its market with the new Spectrum computer and is now providing an alternative to DEC in many areas.

Bradmark Europe Ltd. displayed its range of database tools and says it has added a graphics interface to its DB General database facility.

Holland House featured three new products, all part of Unispool: Unispool 3.2, Unispool/UX and Unispool/Xport.

Herstal had on display the rewritable optical disc drive it's marketing.

The consensus at the conference was that HP is moving out of its traditional science/engineering-based stance and now is cutting into DEC territory. —*Peter Mullins, European Correspondent*

Cognos Previews PowerHouse StarBase

The SQL RDBMS Is Now Available On HP-UX

Cognos Inc. previewed its version of PowerHouse StarBase for HP-UX operating systems at the Interex HP Users Conference Sept. 11-14.

PowerHouse StarBase, an advanced SQL relational database management system, is targeted for release on HP-UX systems in early 1990.

A feature of the product is advanced data integrity control provided by the centralized definition of validation rules and procedures (triggers). Its multiversion record management and optimistic record locking schemes provide high throughput for multiuser applications. Its support of the two-phase commit protocol, together with other multidatabase features, makes it possible to build applications around several databases rather than one large central database. Distributed applications can be developed by using the product's PowerHouse StarNet component, which will provide access to remote databases across TCP/IP networks.

Contact Cognos Inc., 3755 Riverside Dr., Ottawa, Ontario K1G 3Z4; (613) 738-1440.

Circle 364 on reader card

TQC Software Earns Upgraded HP Marketing Status

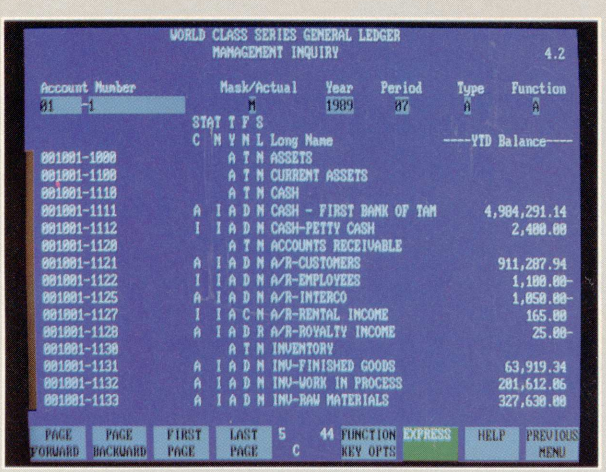
Identified As High-Quality Solution For HP Computers

Test Quality Company (TQC) Inc. has earned HP's "HP+ Referenced" status for its software solutions and CASE tools. The rating is reserved by HP for its Value-Added Businesses (VABs) that receive high product ratings from their customers. The referencing program provides additional benefits to the VAB company in HP marketing services, and it's one of the ways that HP identifies high- quality value-added software solutions for HP computers.

TQC's software operates on HP 9000 technical computers in HP-UX (UNIX), BASIC and PASCAL. The products provide solutions, and CASE and productivity tools to users in laboratory automation, test and measurement, manufacturing quality control and assurance, in-process inspection and production test applications.

Contact, Test Quality Company, 2316 Walsh Ave., Santa Clara, CA 95051; (408) 986-8880.

Circle 372 on reader card



The World Class Series software offers an express key that enables movement between screens and applications.

Collier-Jackson Announces World Class Series Software

Accounting And Human Resource Software Works On HP 3000

Collier Jackson, a Compuserve Software Products Division company, has released its World Class Series accounting and human resource software for the HP 3000 series of minicomputers.

Through express keys, users can quickly navigate from screen to screen within a particular system and move between applications just as easily. A consolidation menu screen now is employed. This allows access to all Collier-Jackson modules as well as any other system.

Another new management feature alerts users whenever a system is nearing a database's capacity. The feature can be set according to user specifications, depending on when notice is preferred.

Contact Collier-Jackson Inc., 3707 West Cherry St., Tampa, FL 33607; (813)872-9990.

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Network Research Announces Shipment Of FUSION TCP/IP

Provides HP 9000 Workstations With TCP/IP Multivendor Networking Ability

Network Research Corp. (NRC) announced shipment of its FUSION Network Software for HP 9000 Series 200 and 300 PASCAL workstations (PWS). The new NRC software provides users of HP 9000 workstations with TCP/IP (Transmission Control Protocol/Internet Protocol) multivendor networking compatibilities for the first time.

TCP/IP, adopted by the Department of Defense, is the most widely used de facto standard for multivendor communications in engineering, manufacturing and commercial networking environments.

FUSION for PWS is $1,000. Contact, Network Research Corp., 2380 North Rose Ave., Oxnard, CA 93030; (805) 485-2700.

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HP NewWave Wins Award From Software Publishers Association

'Best Graphical User Interface Design In A Business Program'

HP NewWave earned the Software Publishers Association (SPA) award for "Best Graphical User Interface Design in a Business Program" at the SPA's annual symposium in San Diego, CA.

HP NewWave is a software environment that makes it easier for computer users to move and update information among applications from different suppliers and to automate routine tasks. The foundation of HP NewWave is its leading-edge object technology based on industry standards.

The SPA is the principal trade group of the microcomputer software industry. Its more than 450 members include the leading publishers of software in business, consumer, education and vertical markets.

Now in its fourth year, the annual industry-wide "Oscar-style" awards program featured entries from 89 companies in 41 categories. The SPA membership voted for the winners in each category.

HP And Apollo Exhibit At Xhibition

X.11 Widgets, Motif Development Tool And Open Dialogue Displayed

HP and its Apollo Division were in attendance at the first annual Xhibition held at the San Jose Convention Center in June. The three-day trade show featured 55 vendors exhibiting workstations, display servers and software products that use the X Window System, a high-performance windowing system designed for distributed computing in a multivendor environment.

Prototypes of the OSF/Motif user interface were on display in the HP booth, as well as in the booths of other major vendors including DEC, Sun and Sony.

Products demonstrated in the HP booth included HP's X.11 widgets, HP's Motif Development Tool, the NewWave user environment and Open Dialogue developed by Apollo. Nine HP representatives gave technical presentations including Kate Erf (Apollo division) who spoke on the Open Dialogue User Interface Management System. *—Peggy King, West Coast Editor*

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OnLine Becomes HP Software Supplier Of PC-Based Branch-Automation Software

Provides Productivity Tools And CAPS

OnLine Financial Communication Systems Inc. has been named a Hewlett-Packard software supplier. OnLine markets, sells and supports its branch-automation software to the financial services industry for use on HP Vectra PCs and other industry-standard PCs.

OnLine's PC-based software provides productivity tools and CAPS, a high-level programming language that reduces application development time.

Each HP Vectra PC running the OnLine software must have a minimum configuration of a single 1.2-MB flexible disc drive and 640 KB of memory. The PCs file server with expanded memory can function as a concurrent file-server workstation.

DSEE Runs As An Application On HP's SoftBench

HP Users Access DSEE's Capabilities On Network, Including Apollo Workstation

Engineers at the Apollo Division of Hewlett-Packard have worked with HP engineers to create a prototype system that integrates Apollo's Domain Software Engineering Environment (DSEE) with the HP SoftBench Toolkit. DSEE on an Apollo workstation is used as a Source Control Server and configuration manager on a network that's accessible to HP workstations.

By using the Encapsulator, part of HP's SoftBench CASE environment, and UNIX networking facilities, HP and Apollo engineers designed a graphical user interface for DSEE. HP's Encapsulator provides a method for connecting a graphical user interface to the predefined standard input and output of a UNIX application. The interface works with over 80 percent of the DSEE commands. The remaining commands require Apollo graphics utilities that are not portable across platforms.

Engineers working on the encapsulation product created a method for invoking and controlling DSEE running on Apollo machines by using a standard UNIX command. Within the graphical user interface, commands usually are invoked through pop ups and command buttons. Each selection calls an event handler which uses a dialog box to request needed data. Users also can enter commands in the main window editor.

DSEE has been used for software engineering environments where engineers do cross target development and write programs that are supported on many platforms. The user interface for the encapsulated version of DSEE is consistent with other SoftBench applications and can send messages to and receive messages from these applications. Before DSEE was encapsulated, its use was restricted to Apollo systems.

Now that there's a prototype integration of DSEE into SoftBench, HP users can access most of DSEE's capabilities via a network that includes an Apollo workstation. Source code stored in DSEE on the Apollo can be compiled and linked on an HP workstation. —*Peggy King, West Coast Editor*

HP And Apollo Combine Forces At Design Automation Conference

Feature CASE Products And Workstations

No matter how you measure it, HP/Apollo was the No. 1 vendor during this summer's Design Automation Conference held in Las Vegas. The combined square footage of their two booths gave HP/Apollo more exhibit floor space than any other vendor; no company had more employees attending, and their workstations were found in the booths of over 40 other electronic design software companies' exhibits.

HP's booth had over 30 workstations, including an Apollo workstation running HP's new CASE product SoftBench. There were over a dozen software vendors demonstrating software on various workstations in the booth's four "corners," circuit design, ASICs (Application Specific Integrated Circuit) design, Software Design (CASE) and Physical Design (Mechanical Engineering). There was also a product showcase area where HP exhibited testers, plotters and support tools along with workstations.

Apollo's booth had 20 workstations, including five of the DN10000 personal supercomputers. Applications that were running on DN10000s in the booth included Gateway Design Automation's logic simulator, Academy from EEsof for Microwave design and simulation, the Opus Dracula IC design-verification package from Cadence Design, and HPSPICE, an analog circuit simulator from Meta-Software Inc.

Two CASE products, one developed by HP and the other by Apollo were featured on the same HP Series 350 workstation. Apollo's (Domain Software Engineering Environment) tool for configuration management and version control was running as an "encapsulated" tool in HP's SoftBench CASE environment. Another newly ported product demonstrated in the booth was LSI's Modular Design Environment (MDE), now available on DN3500 and DN4500 workstations. —*Peggy King, West Coast Editor*

Sidetracked by file management and program library maintenance chores?

LIBRARIAN—the direct route to automated file management.

Managing software change is a tough job. Slip up, and you're faced with duplicate source code updates, missing program versions, and unauthorized modifications to production files. Implement manual controls, and you often create a problem larger than the one you set out to solve.

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LIBRARIAN handles every aspect of your software production process, including quality assurance, release to production, and version control—automatically! The system also implements testing standards, authorization procedures, and check-in/check-out processes.

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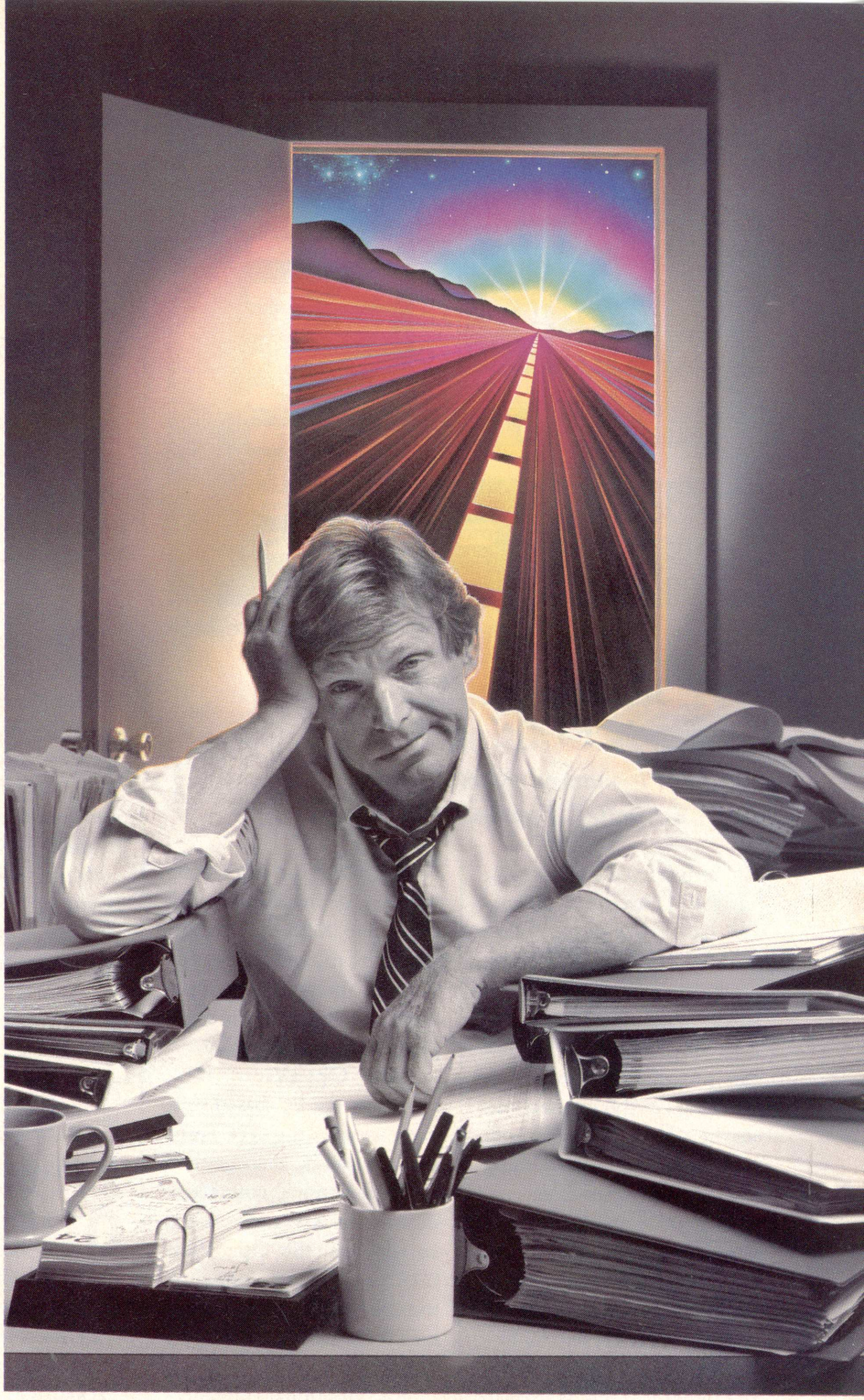

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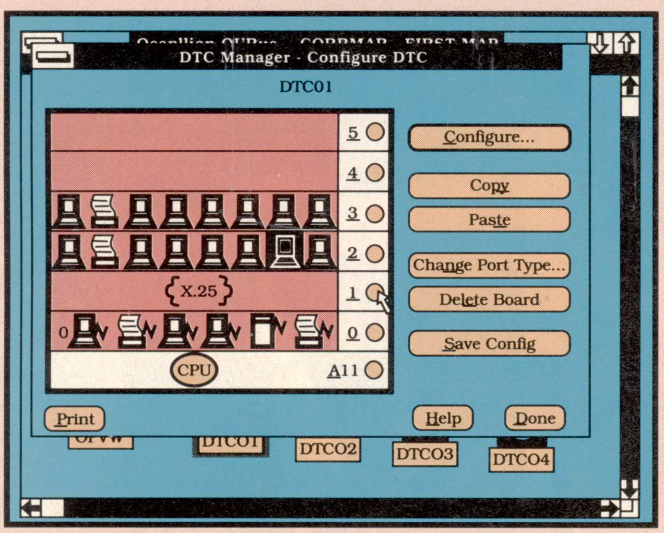


OpenView DTC Manager Screen

MPE XL Release 2.0 Expands Utilities

Provides Enhanced Networking For Distributed Terminal Controllers

The first release of MPE XL, the Distributed Terminal Controller (DTC) used with an HP 3000 Series 900, connected terminals to a single system. With the release of version 2.0, a DTC now can provide wide area networking (WAN) connections via the X.25 XL Network Link and allow terminal switching in multiple system environments.

The X.25 Network Link supports device-to-system communications with remote terminals or printers connected via Packet Assembler/Disassemblers (PADs). When the Series 900 link is used in conjunction with the NS3000/XL Network Services, the link also can support system-to-system communication with remote computers.

The hardware component of the network link is HP's DTC/X.25 Network Access, a VSLI data communications card that is placed in the DTC. A single DTC can support up to three of these cards. Because one X.25 card can be shared by multiple Series 900 systems, multiple cards usually are necessary only in high-performance applications.

The OpenView DTC Manager, the PC-based software used by the DTC, provides network management for local terminal connectivity as well as X.25 networking. In addition, the OpenView DTC is used to configure, monitor, diagnose and download software to one or more DTCs in a network.

An additional enhancement to DTCs is the ability to support terminal switching in multisystem configurations. The DTC/Terminal Access supports asynchronous connections to terminals, PCs in terminal emulation mode and serial printers. Before MPE Release 2.0, asynchronous terminals were available only on a single system, but the new terminal switching capabilities allow the DTC to access all HP 3000 Series 900 systems that reside on a LAN.

GNYUG Holds First Annual International Conference

Vendors And Presentations Provide Latest Insights In The HP 3000 Market

The Greater New York Users Group (GNYUG) is holding its first annual HP 3000 International Conference, Nov. 8-10 at the Penta Hotel, New York City.

Designed around seminars, presentations and vendor exhibits the two and one-half day conference will provide the most up-to-date information on the products and services found in the HP 3000 market.

More than 30 vendors are registered for the show including Adager, Computer Solutions, Dynamic Information Systems, EMC, Hewlett-Packard, NSD, Software Systems Technology and Walker, Richer & Quinn.

The conference will include approximately 25 presentations and seminars from several of the most knowledgable experts in the industry. Topics include: disaster recovery, electronic forms, PC integration, application development and 4GLs, distributed databases, backup stechnology and security.

For more information about the conference contact John Evans at (716) 343-9775.

ORBiT Software Earns HP PLUS Certification

Demonstrated Outstanding Performance In Reviews Specified By HP

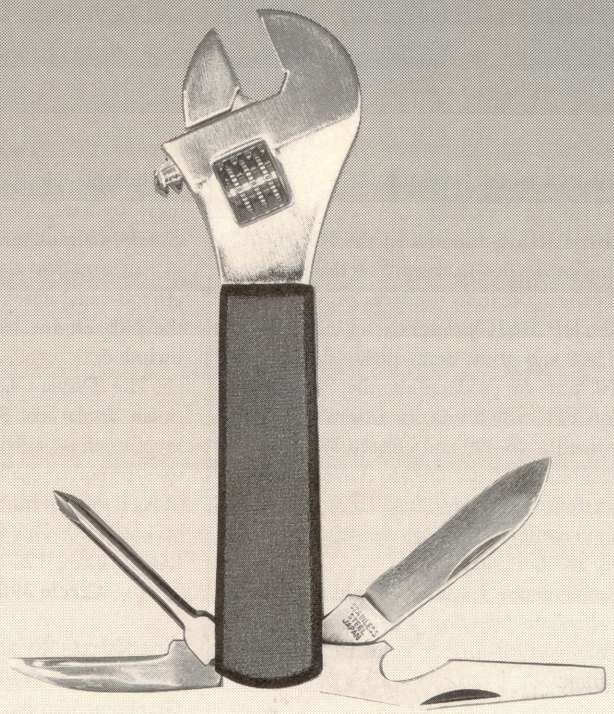
ORBiT Software (Danville, CA) has earned the HP PLUS certification for its ONLINE-BACKUP/3000 software package. HP PLUS is an award presented by Hewlett-Packard for products that have demonstrated outstanding performance in a series of reviews as specified by HP. This certification testifies that the product performed satisfactorily as documented by specific customers who are using the product in actual work environments.

ONLINE-BACKUP/3000 is an advanced software product for MPE V systems that allows the backup process to run while users are logged on and have full access (read, write, purge, etc.) to their data. Zero downtime can be achieved when backing up IMAGE databases; five to 10 minutes of downtime when backing up other types of files.

Contact, ORBiT Software (USA) Inc., 319 Diablo Rd., Suite 218, Danville, CA 94526; (415) 837-4143.

Circle 373 on reader card

TOOLS TOOLS



Finding the right utility is finally easier!

For most HP3000 system managers, standardization is an unexpected luxury. Owning five separate utility packages means speaking five different languages, having five unrelated manuals and five different support numbers to remember—that's not what we call "efficient."

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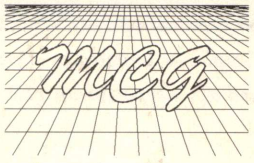
ALLTOOL is easy to use and has a complete on-line help system, plus a 24 hour technical support line.

ALLTOOL performs operations such as automated IMAGE database and MPE file functions. **ALLTOOL** can backup "IN USE" IMAGE databases and MPE files to disk or tape. Recover spoolfiles lost during system restart with **ALLTOOL.** Use **ALLTOOL** to save job information to disk or tape for later restreaming. **ALLTOOL** allows you to view OPEN spoolfiles. It identifies heavy CPU users and manages their queues.

ALLTOOL extends MPE capabilities with complex filesets, file-driven execution and "if...else...endif" fileset criteria. **ALLTOOL** also offers a full-featured macro language as an interface between itself and existing applications.

THE ONLY FEATURE **ALLTOOL** DOES NOT HAVE IS A BIG PRICE! Call or write for a complete list of features or to request a demo tape. ***ALLTOOL/XL** is under development for the Spectrum series.



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CIRCLE 232 ON READER CARD

NEW PRODUCTS

HP Announces Impact Dot-Matrix Printer

Hewlett-Packard announced the HP 2562C tabletop impact dot-matrix printer that provides faster printing than its predecessor.

The HP 2562C printer has a U.S. list price of $5,500 and prints draft-quality documents at 420 lpm. Its predecessor, the HP 2563B Option 114, which was discontinued June 1, was priced at $6,390 and printed 300 lpm.

Standard character sets are Roman 8, draft quality, line draw, large block, 13.3 characters-per-inch compressed, high-density near letter quality and bar codes.

Convenience features include paper-out and paper-jam detection, a 16-channel downloadable vertical-format control and forms alignment.

LSI Logic Offers Design Tools For Apollo Workstations

Hewlett-Packard's Apollo Division and LSI Logic's Modular Design Environment (MDE) software tools will be available on the Apollo Series 3000 and Series 3500 personal workstations and Series 4500 personal superworkstation.

MDE software, a set of tools for the design of application-specific integrated circuits (ASICs), consists of sophisticated, high-performance simulation and design modules and a set of libraries. MDE tools facilitate the design of both cell- and array-based ASICs ranging from single, low-gate count devices to complex, multiASIC systems.

Display List Driver Works With AutoCAD

Nth Graphics has released an enhanced display list driver for AutoCAD Release 10 running on SCO XENIX 386 Version 2.3 for Nth Engine display controllers.

The new driver supports display list zooms and pans in AutoCAD viewports, all 3D functions, and uses "Master/Slave" display list management to reduce the amount of display list RAM needed when displaying a drawing in multiple viewports. It allows AutoCAD users to load, view and zoom up to five drawings simultaneously and to drag figures in real time for accurate placement of large objects-capabilities completely unique to the Nth Engine. A pop-up control panel is included.

The Display List Gauge indicates how much display list RAM a drawing uses and how much is available. The Color Bar lets the user turn off or display selected colors instantly in each viewpoint.

Contact Nth Graphics, 1807-S West Braker Lane, Austin, TX 78758; (512) 832-1944.

Circle 396 on reader card

Graphicus Products Support X Windows

Graphicus Inc. has announced support of X Windows for all its products supported on HP 9000, 300 and 800 Series computers. New versions of the company's products GRAFIT, DRAWIT and STATIT have been released to support the X Window environment, as well as providing additional capabilities and new features.

The GRAFIT, DRAWIT and STATIT systems form a modular family of technical graphics and data analysis systems used in manufacturing and engineering environments. Applications for the Graphicus products include statistical quality control, engineering data analysis, presentation graphics and technical illustrations.

Contact Graphicus Inc., 150 Lake St., Suite 206, Kirkland, WA 98033; (206) 828-4691.

Circle 382 on reader card

CaSaT Offers Ethernet Port Monitor

CaSaT Technology Inc., a manufacturer of networking hardware, has introduced the model ERT-4308 Remote Diagnostic Monitor for IEEE 802.3 networks. The monitor can be placed anywhere between a network DTE port and transceiver to provide visual indication of data transmission and reception, the presence of collision signals and the presence of transceiver power.

The ERT-4308 can be used as either a diagnostic tool or as a DTE monitor for verification of proper network operation. Compatible with any transceiver, repeater, hub, bridge or other IEEE 802.3 device, it provides visual indication of proper port operation.

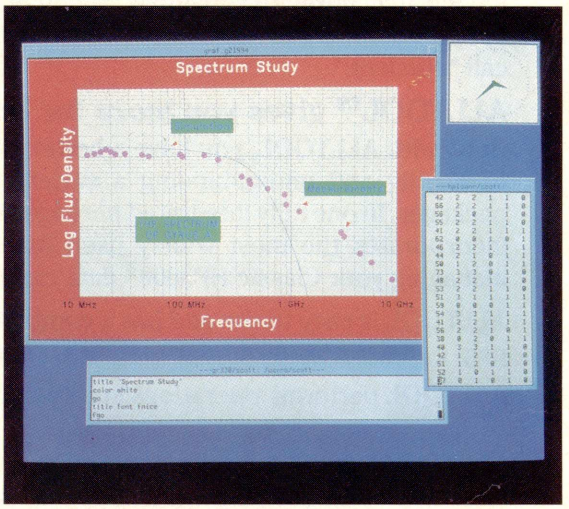
The ERT-4308 Remote Diagnostic Monitor requires no external power and is attached to any 15-pin AUI cable connector with convenient slide latches.

Contact CaSaT Technology Inc., 10 Northern Blvd., Amherst, NH 03031; (603) 880-1833.

Circle 394 on reader card

Executive Insight Allows Access To Information

Hewlett-Packard introduced HP Executive Insight, a combination of software and services



Graphicus announces support of X Windows for products supported on HP 9000 Series 300/800.

that allows executives and managers to monitor key business factors at the push of a button.

HP Executive Insight automatically turns complicated data into graphs identifying trends as they begin, allowing managers to react immediately instead of waiting for month-end reports.

Based on existing HP products and services, HP Executive Insight is the result of the integration of five software products: HP Information Access, HP Resource Sharing, HP DeskManager, HP Graphics Gallery and Lotus 1-2-3 or Symphony.

IEM Offers Erasable Optical Storage

IEM Inc. introduced the model MOD5-HP650 Erasable Optical Disc Drive. It offers the high capacity and a data security of a WORM (write-once, read-many) drive, without the restrictions. Magneto-Optical cartridges are compact, durable, easily transported to other locations and virtually impervious to any naturally occurring magnetic fields.

The drive, offering up to 650 MB of storage per two-sided optical disc cartridge, uses the CS-80 data transfer protocol and attaches via an HP-IB bus. An autochanger also is available.

Contact IEM Inc., P.O. Box 8915, Fort Collins, CO 80525; (303) 223-6071 or (800) 321-4671.

Circle 393 on reader card

QTC Unveils Ada Math Advantage Library

Quantitative Technology Corp. has announced the availability of Release 2.0 of the Ada Version of its Math Advantage Library.

Ada Math Advantage is a scientific and mathematical procedures package for the Ada community. This package offers Ada programmers the same kind of functionality that has long been available to FORTRAN programmers. The reusable library is divided into 15 packages including Basic_Math, Miscellaneous_Vector_Operations, Data_Manipulation, Data_Rearrangement, Interpolation, Integration and more.

The product is provided in source code form to allow users to compile only the packages necessary. Ada Math Advantage can be licensed on a yearly basis to run on a variety of computer platforms. First year licensing fees range from $2,000 to $15,000.

Contact Quantitative Technology Corp., 8700 SW Creekside Place, Beaverton, OR 97005; (503) 626-3081.

Circle 391 on reader card

Computer-Link offers Series 3000 Tape Evaluators.

BBS Adds Six Products To SpeedEdit Line

Bradford Business Systems announced six new products: SpeedEdit/DOS, SpeedEdit/OS2, SpeedEdit/UNIX, SpeedEdit/Windows, SpeedEdit/PM and SpeedEdit/X. These SpeedEdit products are full-screen editing systems for programmers and run under various operating systems and platforms. The products were developed for HP 3000 computers.

Contact Bradford Business Systems Inc., 25301 Cabot Rd., Suite 201, Laguna Hills, CA 92653; (714) 859-4428.

Circle 395 on reader card

SYBASE System Supports AT&T's LAN Manager/X

Sybase Inc. announced that the SYBASE system, running on UNIX System V Release 3.2 from AT&T, will support AT&T's LAN Manager/X (LMX) and will be a UNIX system implementation of Microsoft's LAN Manager networking software for OS/2. AT&T plans to market this network server under the AT&T StarGROUP software family name.

Now, SYBASE SQL Server for UNIX System V also incorporates support for "named pipes," the API (application programming interface) used by the OS/2 SQL Server with LAN Manager and LAN Manager compatible networks. AT&T's StarGROUP software LMX server will provide the networking software that connects MS-DOS, OS/2 and UNIX System V computers.

Contact Sybase Inc., 6475 Christie Ave., Emeryville, CA 94608; (415) 596-3500.

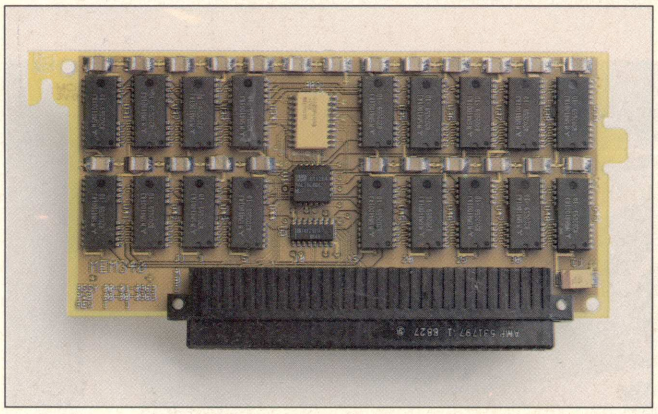
Circle 392 on reader card

Computer-Link Extends Tape Cleaner/Evaluator

Computer-Link Corp. (Wilmington, MA) has announced the Model 3800-6 tape cleaner and evaluator for computer tape users.

Operating with tape densities from 800 to 6,250 bpi you can select the wide variety of testing and cleaning operations performed by the Model 3800-6.

This model cleans magnetic computer tape by removing debris and loose oxide particles responsible for data errors. After cleaning, tape is evaluated for data handling capability. The user has control over the test criteria the tape must pass in order to be accepted. For tapes that have permanent (unrecoverable) problems, the system is able to isolate subsections of the



DTACK Systems Inc.'s new MEM340, a 4 MB add-on board for HP 9000 Series 340 workstations.

tape that are unusable and can be stripped. This "stripping" operation allows otherwise defective tapes to be used.

Contact Computer-Link Corp., 3 Lopez Rd., Wilmington, MA 01887; (508) 657- 8820.

Circle 397 on reader card

Zyxomma Ltd. Releases FASTNET For HP Systems

Zyxomma Ltd. has announced the latest release of FASTNET, a high-level software framework for building real-time distributed processing systems.

FASTNET provides the software system engineer with a design framework for building systems that are inherently network node independent. Because the communication channels between processes for sending and receiving data and commands are handled by FASTNET, the designer is relieved of the need for involvement with these lower levels.

This latest release of FASTNET is available to run on networks built from HP 1000, HP 9000, Vectra, IBM PC and several other UNIX-based systems, using Ethernet LANs. Support also now is provided for X-Windows and Transputer based nodes.

Contact Zyxomma Ltd., 40 Littledown Dr., Bournemouth, England BH7 7AQ; 0202 35453.

Circle 390 on reader card

HP 9000s Integrated With LAN Networks

With the Syntax SMBserver, HP 9000 computers now can be integrated with existing LAN networks using Ethernet and the industry-standard TCP/IP protocols.

PC application software can use the HP 9000 server computer files and printer queues as if they were local resources. SMBserver clients who are authorized to access the Network File System (NFS) can use files on other minicomputers as if they were stored in the PC's own disc system.

The SMBserver implements Microsoft's Server Message Block (SMB) standards, supports the U.S. Department of Defense TCP/IP protocols, and provides services to NetBIOS applications on networked PC workstations.

The SMBserver for the HP 9000 is licensed for specific numbers of concurrent PC client connections. Licenses are priced from $900 (for four clients) to $10,600 (for an unlimited number of clients).

Contact Syntax, 1501 West Valley Highway North, Suite 104, Auburn, WA 98001; (206) 833-2525.

Circle 388 on reader card

DTACK Systems Introduces HP340 Memory

DTACK Systems Inc. has released its latest RAM board product, the MEM340. The MEM340 is a 4 MB RAM add-on board for all HP 9000 Series 340 workstations. The system memory of an HP 340 workstation can be expanded from its factory shipped 4 MB of RAM to 8M-, 12M- or 16 MB using MEM340 boards.

Price of the MEM340 is $3,400.

Contact DTACK Systems, 120 Chaparral Court, Suite 150, Anaheim Hills, CA 92808; (714) 998-2244.

Circle 378 on reader card

Continued on page 84.

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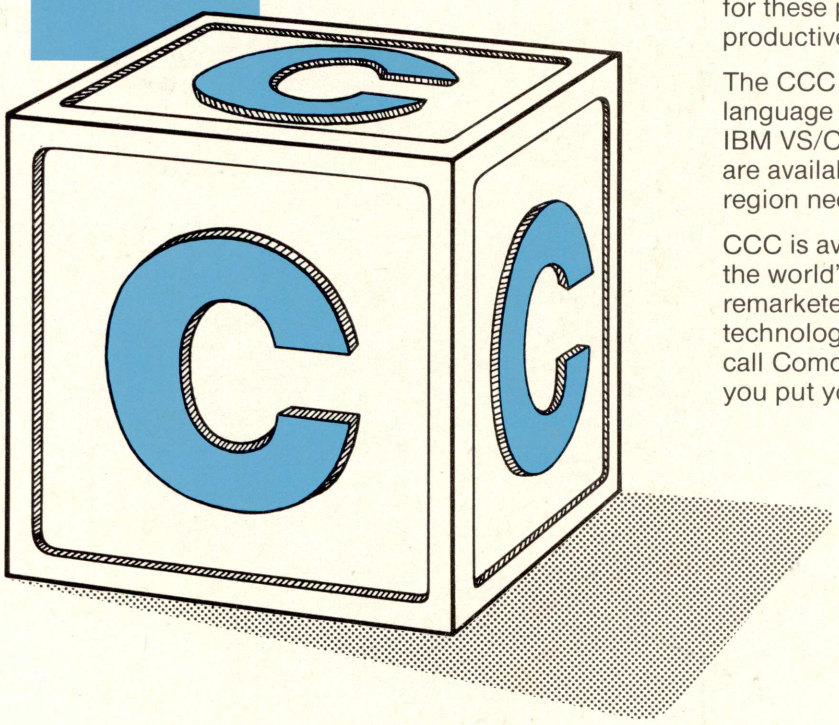

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Spectrum in sight?

Adager began shipping Spectrum-compatible software in August 1987.

Adager works on ANY HP3000 computer running IMAGE/3000 or TurboIMAGE under MPE or MPE/XL.

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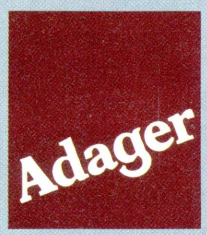
The only difference is performance: Adager really flies on Spectrum!
For example, the BARUG Shootout Benchmark (which Adager runs
in 1 hour 14 minutes on a Series 70) takes 15 minutes on a Series 950.



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*Naturally, Adager handles (as a matter of course) the versions called TurboImage and TurboImage/XL.

CIRCLE 102 ON READER CARD

Improving Productivity In The

'HIDDEN' FACTORY

The Benefits Of Transferring Shop Floor Methods To Administrative Functions

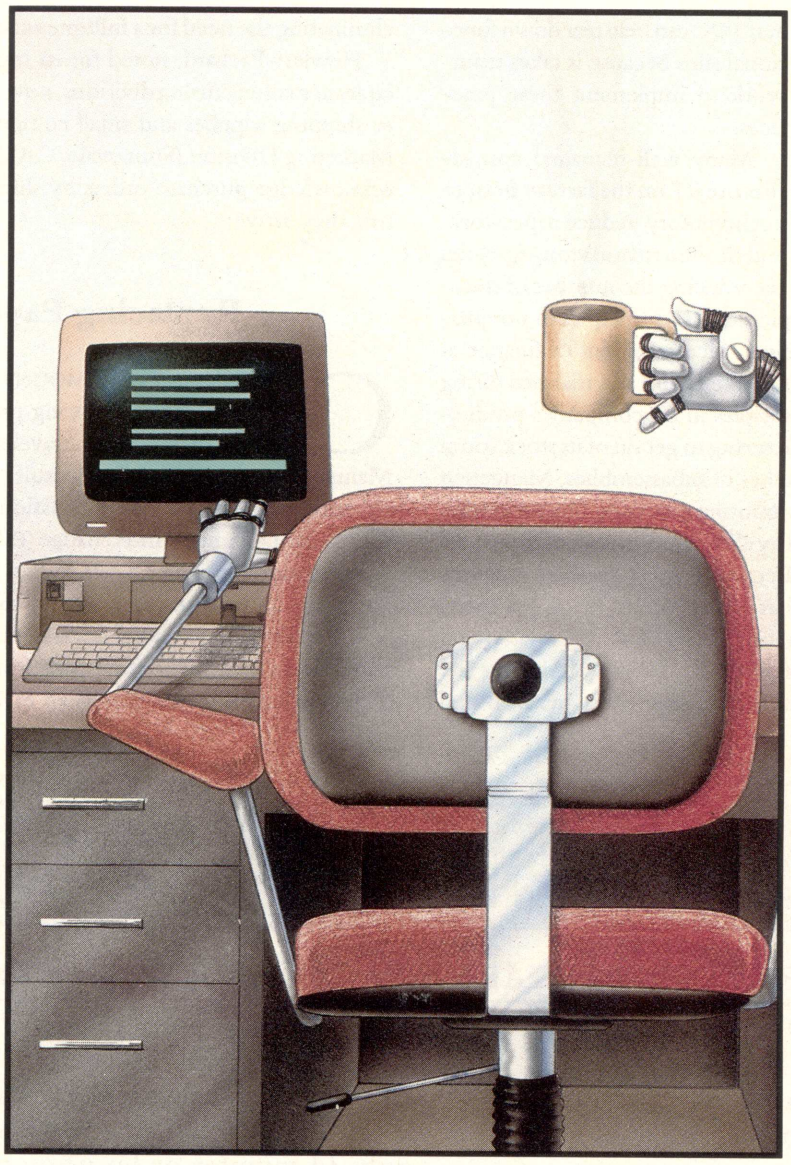
[BY PEGGY KING]

There's good news to report from manufacturing facilities across the U.S. Direct labor costs are down and yields are up, thanks to increased worker productivity and automation of some repetitive functions.

Just-in-time (JIT) methods of working with suppliers have reduced the overhead costs of inventory and minimized the amount of rework. Total quality control (TQC) training and policies have reduced or eliminated the need to perform inspections, now that all workers are responsible for quality. Computer Aided Manufacturing (CAM) software has automated the process of delivering design information to manufacturing, thereby eliminating delays and reducing the amount of inaccurate information passed between engineering and manufacturing. And, companies that adhere to Design for Manufacturability (DMF) principles are finding ways for their manufacturing and engineering departments to work together to create products that satisfy customer needs.

While direct labor costs continue to decrease, overhead costs represent an increasing percentage of the cost of manufactured goods. Management consultant Rick Walleigh, a partner in the San Jose, CA office of Arthur Young, refers to overhead costs associated with creating, tracking and analyzing transactions as the "Hidden Factory." Because manufacturing companies employ an increasing number of knowledge workers (professional and administrative employees) and fewer direct laborers than ever before, the most effective way to increase factory productivity is to find ways to make the hidden factory workers more productive. Nevertheless, most

American companies still focus on reducing direct labor costs when they attempt to improve productivity and competitiveness. Today, it's time for the same companies that have used DFM, CAM, TQC, and JIT to improve shop floor productivity by applying similar techniques to lower the overhead of administrative functions.



Some of the key principles for improving productivity on the shop floor also apply to the administrative office. In both locations, every job should be a thinking job. Employees need to have an understanding of how work affects the entire process and the finished product. They need to understand the company's business direction and to team up with people in other functional areas for problem solving. It's also important for *all* employees to know who their customers are and how to meet their needs. Often it's more difficult for administrative workers to become aware of who their customers are because of an insufficient administrative process or poorly designed form.

Internal Customers

AN EXTERNAL CUSTOMER IS the person or company who buys the product. Within a company, various functional groups do work that gets passed to other groups. Internal customers are the employees who use the work of other employees. For example, Manufacturing is the internal customer of Engineering because production workers use Engineering's product designs.

Some internal customers are more visible than others. For example, order entry clerks may think that salespeople are their only internal customers. When a salesperson asks a clerk to "hold his place in line" by creating a work order for a product before the customer has signed a purchase order, the clerk may think he is doing the salesperson and the external customer a favor.

Order entry clerks need a broad understanding of how their function affects the rest of the production cycle. In his eagerness to please the salespeople with whom he comes in contact, he may not realize that the people on the shop floor who build the product are also customers. Creating a provisional work order wreaks havoc with supply projections because, more often than not, the customer will delay the purchase, choose different options, or decide not to buy. If the clerk understands where the work order goes and how it's used, he will be able to explain to the salesperson why it isn't possible to produce a work order until there is a signed purchase order.

The problem of having isolated functions within a company has been dubbed the *functional silo syndrome*. Companies that suffer from the functional silo syndrome have separate hierarchies for Production, Engineering, Purchasing, Marketing and Sales. The managers for each function are perched at the top of these silos, and they don't communicate with each other.

Silos are tall, windowless structures. The middle managers, supervisors and workers trapped inside them don't see what is happening in any other operation within the company. Unless members of various departments share a common view about the business and its customers, employees won't understand how their function affects the rest of the company. Employees who are sequestered in functional silos don't understand that satisfying the internal customer in the next operation leads to a better or more profitably manufactured product and is therefore crucial to the success of the business. Good manufacturing practices like JIT

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Raytek Inc.
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and TQC can help tear down functional silos because it takes teamwork to implement these practices.

Many well-managed companies use JIT on the factory floor to cut inventory, reduce paperwork, and shorten manufacturing cycles by reducing the number of transactions. It's also possible to implement JIT principles in nonproduction settings. Steve Mangelsen, vice-president of finance at Raytek Inc. (Santa Cruz, CA) worked with the manufacturing department to establish JIT principles in his company's production area. After helping manufacturing to get rid of its stock room by reducing inventory and batches of subassemblies, Mangelsen transformed the company's accounting practices. Cost accounting procedures were simplified by eliminating the need to analyze indirect manufacturing costs. Because Raytek produces finished goods only when a customer has ordered them, there's no need to allocate burden. Mangelsen now expenses all of the labor and all of the material content of products, thereby reducing the number of transactions that an accountant must perform and eliminating the need for a fulltime accountant to analyze burden.

Hewlett-Packard, noted for its implementation of JIT principles at manufacturing divisions, now applies the same principles to shipping supplies and small computer products. The Direct Marketing Division (Sunnyvale, CA) has eliminated the need to acknowledge purchase orders by shipping orders the same day that they arrive.

Replacing Paperwork

CAM REDUCES THE AMOUNT of paperwork needed on the shop floor by storing product information online instead of attaching travelers to every subassembly. Manufacturing engineers can consult "virtual documents" on the terminal screen to access information about a product or part. Electronic Document Interchange (EDI) is similar to CAM in that it reduces or eliminates paper traffic. EDI can be used between companies or between the various departments in one company.

HP makes use of virtual documents to eliminate the need for paper when orders are transmitted from sales offices to factories. The company also has started an EDI project with some of its

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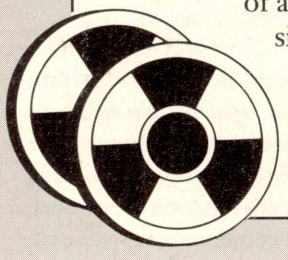

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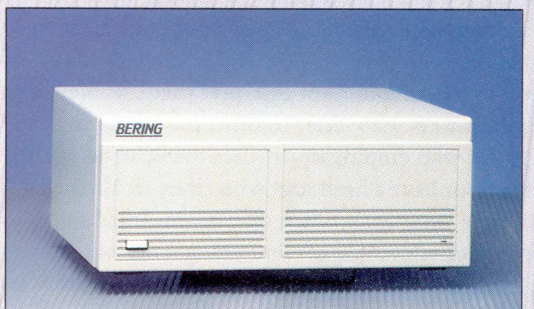

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CIRCLE 104 ON READER CARD

suppliers. The arrangement has helped buyers at HP to save time and has reduced or eliminated the expenses of producing paper copies of purchase orders for these suppliers.

Mangelsen has eliminated paperwork by making sales orders (online documents) rather than purchase orders (paper documents), the driving documents for generating work orders. He estimates that paperwork transactions cost an average of $50 each. Therefore, Mangelson now uses online documentation to eliminate paperwork wherever possible.

> ...three reasons why the hidden factory is so expensive and unproductive: complexity, confusion and variability.

TQC makes quality every employee's responsibility. In the factory, the role of quality inspectors can be reduced or eliminated if each employee is responsible for checking his own work. In the administrative office, TQC requires each employee to understand enough about the company's business to make informed decisions.

For example, the more that order entry clerks know about the company's products and customers, the better they are able to find errors and incomplete line items on work orders. A clerk with knowledge of the product line is more likely to detect errors on a parts list because he knows which parts are needed to make various products. Similarly, a clerk who knows who the company's customers are and what they typically order may be able to detect errors or omissions in a salesperson's order.

The data processing department can help to reduce the rate of clerical errors by designing data entry screens to be almost foolproof. Unfortunately, it takes more of a programmer's time and effort to design a form that will be easy for a data entry clerk than it does to put out the sort of form that allows or even encourages typing errors. According to Lisa Burns, Programming and system analysis manager for HP's Order Management System, some things programmers can do to design good forms include minimizing the number of extraneous keystrokes that the data entry person needs to make, placing fields for ease of typing rather than ease of programming, making screens as similar to one another as possible and using technical edits to filter some of the invalid dates and times caused by typing errors. A field with a technical edit is one that has a condition attached to it. For example, a field that asks for the date of purchase can have a technical edit that prevents future dates from being entered.

Well-designed screens are worth programming time because they help data entry clerks catch errors before the forms are transmitted to the next operation. But edited fields in forms can't catch every mistake; fields can flag illogical dates but they can't correct misspelled names. TQC principles require that all employees check their own work and strive to achieve zero defects.

Design for manufacturability (DFM) can apply to designing forms in the office as well as to parts in the factory. In companies that have implemented DFM, members of engineering and manufacturing departments communicate with one another and work together to design manufacturable parts. The same kind of teamwork can lead to more "manufacturable" documentation for transactions between customers and the sales force or within the accounting function. According to Mangelsen, a well-designed work order must take into account how salespeople sell the company's product. In order to calculate the costs of sales, the accounting department needs to know how the sales force sells products. Therefore, the documentation should include the conditions of sale, the price, method of payment, the form of shipment and the commission.

Typically, work orders are designed by people on the administrative side of the company, but it's the production workers who must read and interpret them. Should the work order list line items by their descriptions or by their part number? If a U.S. company employs many non-English or limited English speaking production workers, these employees may find it easier to identify parts by their number. On the other hand, it may be preferable for order entry employees to see actual descriptions of line items in order to detect errors or omissions. Which method should prevail? One of the benefits of automating the production of forms is that the information can be represented in one way for production and another way for administrative workers. The solution is for the system programmers to map part numbers to part descriptions and provide a mechanism for choosing which representation to use. The trick is in knowing what needs to be done. It's impossible for the people designing forms to know what works best for their "customers" unless they talk to the production workers who must interpret them, as well as to the knowledge workers who enter information on them.

Companies who employ up-to-date manufacturing methods on the shop floor have a head start when they tackle the problem of streamlining their back office operations. In addition to the tremendous profit potential of eliminating duplicate transactions and repetitive checking functions, knowledge workers can be freed to do more interesting work if automation takes over the routine tasks. Walleigh lists three reasons why the hidden factory is so expensive and unproductive: complexity, confusion and variability. One way to slay this three-headed dragon is to have well-designed paperwork and to use online documentation in order to have less of it.

The new method of transaction accounting that Mangelsen instituted at Raytek Inc. tackles the problems of complexity, confusion and variability. In Accounts Payable, the accounting clerk no longer has to match purchase orders to receiving

documents, and receiving documents to invoices, in order to generate a check. With the new method, the clerk simply takes a look at the receiving documents and makes a check to cover whatever goods have been received. This simplification has reduced the Accounts Payable function from a task that required two or three employees to being a half-time job for one person. The system also reduces the confusion of trying to match invoices to purchase orders and receipts. Often a supplier will ship an incomplete order. The old method required the A/P clerk to generate duplicate paperwork for these incomplete orders. Raytek's new transaction accounting system also reduces variability because the Account Receivable screens will look the same as the Accounts Payable ones. As Mangelsen puts it, "What's receivable on one end is payable on the other." Because there are common transaction processing forms for the two accounting functions, employees in accounting can move between functions because they understand both tasks.

The Arthur Young nametag for eliminating complexity, confusion and variability is Continuous Process Improvement (CPI). Principles of CPI can be equally effective in companies as small as Raytek with under 50 employees or as large as Hewlett Packard with more than 90,000. Regardless of the company's size, all ongoing business activities, whether they involve paperwork or soldiering irons, are composed of processes. Processes can be improved, and process improvements can be measured.

According to Walleigh, "Process performance measures should be established and measured for each process in the hidden factory and these performance measures should be the critical factors that tell whether or not the job is getting done right."

But before processes can be measured, they must be thoroughly understood. In order for the improvement to begin, a company needs to obtain an accurate picture of its current situation by documenting the actual processes that are targeted for improvement. It's harder to eliminate overhead than to eliminate direct labor costs and that's one reason why most companies focus on the production department rather than the offices when they seek to cut costs. Nevertheless, improving processes in the administrative offices pays off not only in time and materials but also in employee satisfaction. Companies that strive for continuous process improvement will automate some of the repetitive and mindless tasks as they work toward creating an environment where employees are problem solvers who understand the business, people work in teams that cross organizational boundaries, and the customers, both internal and external, are satisfied.

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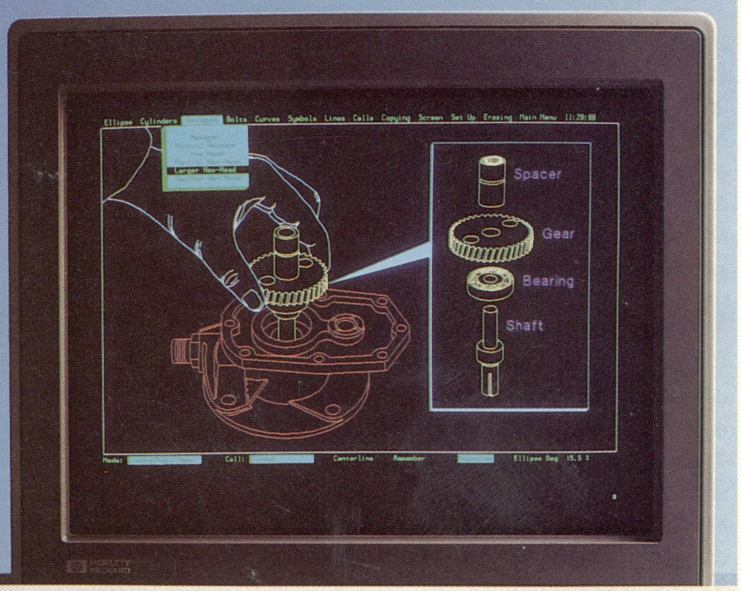

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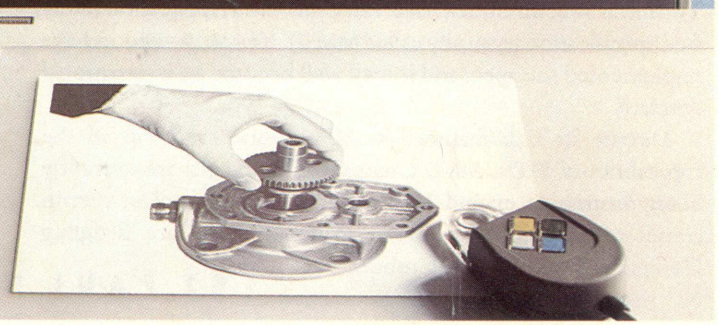

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Manufacturing Message Specification

MMS Improves Control Of The Factory Floor

Manufacturing Message Specification (MMS) is an application layer service in a MAP 3.0 communication stack. MMS is designed to give cell control computers the communications tools necessary to direct/monitor the activities of factory floor devices (FFDs) such as robots, programmable logic controllers (PLCs), numerical control (NC) machines, automated guided vehicles (AGVs), etc. For instance, MMS commands drive PLCs by downloading and executing programs, by reading and writing critical process variables, and by setting and releasing semaphores. *Figure 1* shows the positioning of MMS within a factory networking hierarchy. Further, MMS has tools for computer-to-computer communications. A binary file transfer facility is provided along with program-to-program messaging via the previously mentioned reading and writing of variables. MMS variables actually can be arbitrarily complex data structures.

ISO/IS 9506 specifies what MMS must do for its users. The spec doesn't detail how that functionality should look to the user. That is, it doesn't specify the user interface. It would be useful if each implementer of MMS built the same interface. A standard interface makes applications portable between different computers and eliminates the effort of learning different techniques for doing the same thing. The MAP/TOP Application Layer Interface Technical Subcommittee has created the MMS Application Interface Specification (typically called MMSI). Key MAP vendors have implemented this spec, and it may well become an international standard.

Despite its rich feature set, MMS alone can't tap all the capabilities of FFDs. MMS Companion Standards are currently being written to extend MMS to allow full control of certain classes of factory devices. For example, there are fledgling Companion Standards for robots, PLCs, NC machine and vision systems. Current MMS products don't support Companion Standards.

MMS/MAP 3.0 is unique in the world of communications services, communicating rapidly and reliably to disparate factory floor devices. Allen-Bradley and Gould-Modicon Data Hiway protocols do allow communication to FFDs. But slowly (56Kbit/s base transmission rate vs. 10Mbit/s for MAP). DECNet, SNA and TCP/IP don't talk to FFDs at all. You'll see the advantages of MMS in the application discussion.

[BY PAUL MORRISON]

Functionality

ISO/IS 9506 IS A LARGE SPEC. The current MMSI contains more than 120 function calls. Fortunately, given the space constraints of this article, MMS capabilities can be grouped into classes that are descriptive of MMS functions.

Before discussing MMS classes it will be useful to develop some specialized vocabulary:

- Application Process — user program requiring MAP communication facilities. Specifically, this is *not* layer seven of the MAP stack.
- Server — a node on a MAP network that provides other nodes with MAP services. Often this is an FFD providing MMS services to a cell control computer.
- Client — a node on a MAP network that requests MAP services from another node (typically, but not necessarily, a cell control computer).
- Virtual Manufacturing Device (VMD) — a set of MAP data structures describing a node's characteristics to other MAP nodes (i.e., a PLC would describe its resources and status via a set of data structures accessible by other nodes on the network).

The MMS classes are as follows:

Connection/Context Management — for peer application processes to interact, they must first have a logical connection (application association) established between them. Connection/Context Management services include: Connection initiation, Connection conclude, Connection abort, Reject (server generated message indicating that a protocol error was received).

Remote Device Status — used to obtain details about a particular VMD and to monitor a VMD's status. Services include: Identify (get vendor name, model and revision), Get capabilities, Get status.

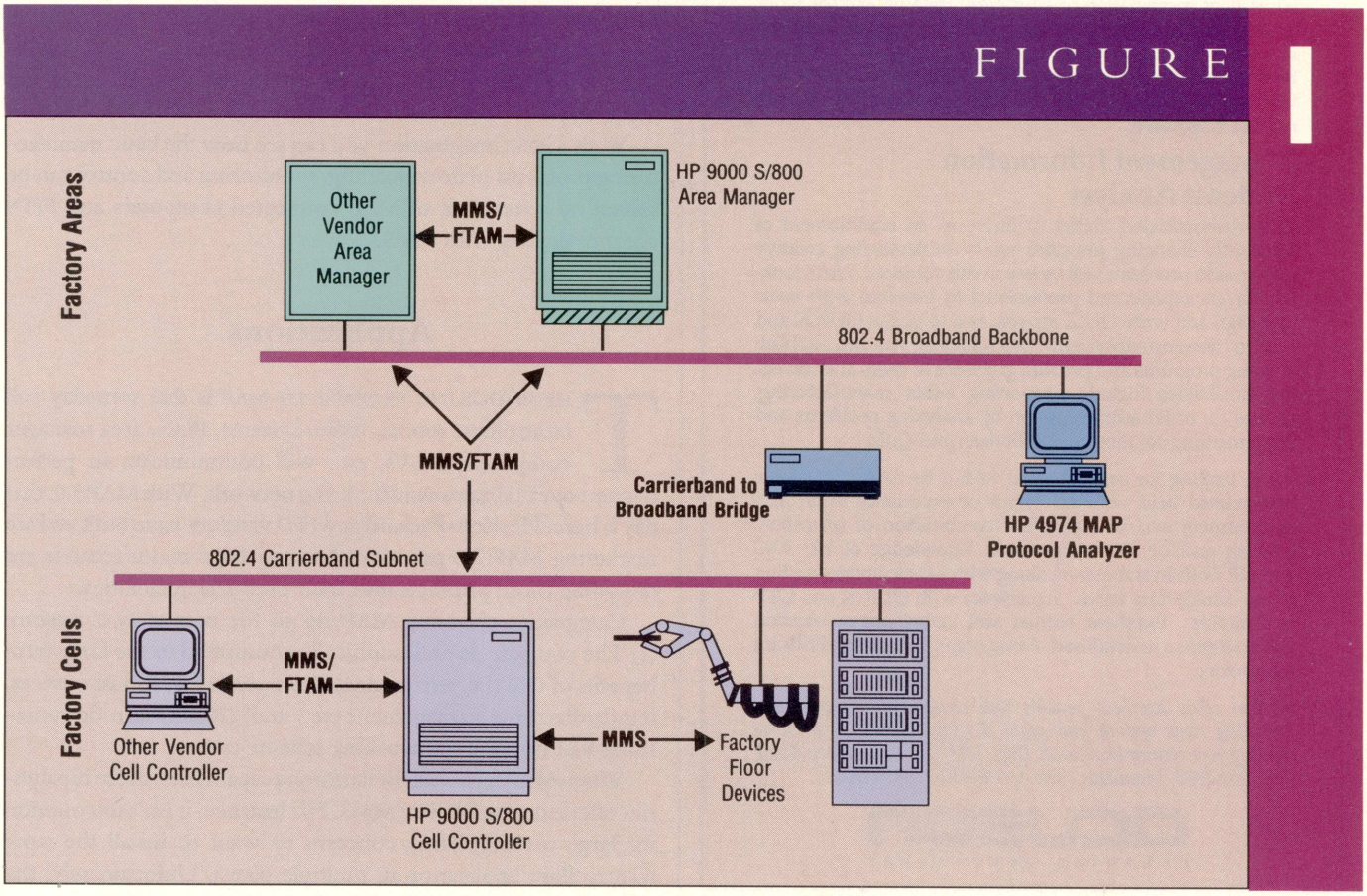
Variable Access And Management — variable reading and writing is a key means of directing and monitoring the activities of a remote device. Variables, in the context of MMS discussions, can be complex data structures. Variables are also a means by which messages can be passed from one computer to another. Variable Access and Management includes: Read, Write, Define, Delete, Report Information (unsolicited report of a variable's value to a remote peer).

Program Upload, Download And Execution — program in this context means a factory floor device program (e.g. an NC program). The archiving, downloading and uploading of FFD programs is central to the control of factory operations. Downloading and uploading typically occur between the RAM of an FFD and disc storage on a cell control computer. Services include: Download (cell controller initiated program download from cell controller to FFD), Upload (cell controller initiated upload from FFD to cell controller), Download' (FFD initiated download from cell controller to FFD), Upload' (FFD initiated upload from FFD to cell controller), Download'' (third node request that FFD initiate download from file server to FFD), Upload'' (third node request that FFD initiate upload from FFD to file server), Program start, stop, resume and reset, Program delete (delete program from FFD).

File Transfer And Management — used for the transfer of binary unstructured files between computers on a MAP network; will not interact with FTAM, OSI's full service file transfer mechanism (i.e., an FTAM file transfer request can't be serviced by the MMS file transfer mechanism). Services include: Remote file open, read and close (transfers file from remote to local node), Remote file rename, delete; Obtain file directory (obtain file directory information), Obtain file (directs a remote node to get a file using file transfer method explained above).

Semaphore Management — the use of flags (semaphores) to reserve and release resources at an MMS server. Included are:

FIGURE 1



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Define and delete semaphore, Take and relinquish control, Report semaphore status (obtains various kinds of data regarding a single semaphore).

Journaling — tools to read and write an information log (journal) on an MMS server. Included are: Initialize journal, Write journal, Read journal, Report journal status (get number of entries).

Operator Communications — services to allow the exchange of messages between a cell controller program and an operator console attached to an FFD. Included are: Input (obtain a string of data from an operator console), Output.

Event Management — tools to enable an MMS server to note and take action upon the occurrence of specified events. For instance, an FFD monitoring the condition of a boiler might note excessive pressure; if "excessive pressure" had been set up as an event, the FFD would take some specified action (e.g. shut down the boiler and notify relevant client computers). Services include: Define and delete event condition (client request to have a condition defined on or deleted from an MMS server), Define and delete event action, Event notification (MMS server message to clients to indicate that an event has occurred), Event enrollment (create list of clients to be informed when an event has occurred).

With a little imagination you can see how the basic manufacturing problems of downloading, monitoring and control can be solved by a network of MAP connected computers and FFDs communicating with MMS.

Applications

THE ENDURING PROMISE OF MAP is that someday cell controllers, robots, vision systems, PLCs, area manager computers, AGVs, etc. will communicate in perfect concert over a single manufacturing network. With MAP 3.0, that day is here. Hewlett-Packard and FFD vendors have built and are marketing MAP 3.0 products. Leading-edge manufacturers are designing those products into their production facilities.

Companies choosing MAP do so for one of two reasons: (1) The company is philosophically committed to the long-term benefits of OSI (i.e. exceptional interoperability, robust services, standardized net management etc.) and, (2) MAP can do something that no other networking scheme can.

When MAP is chosen for its unique capabilities, those capabilities often are provided by MMS. For instance, it isn't uncommon for large manufacturing concerns to want to install the same factory floor application in multiple plants. Unfortunately, the same FFDs aren't necessarily present at all sites. PLCs in particular

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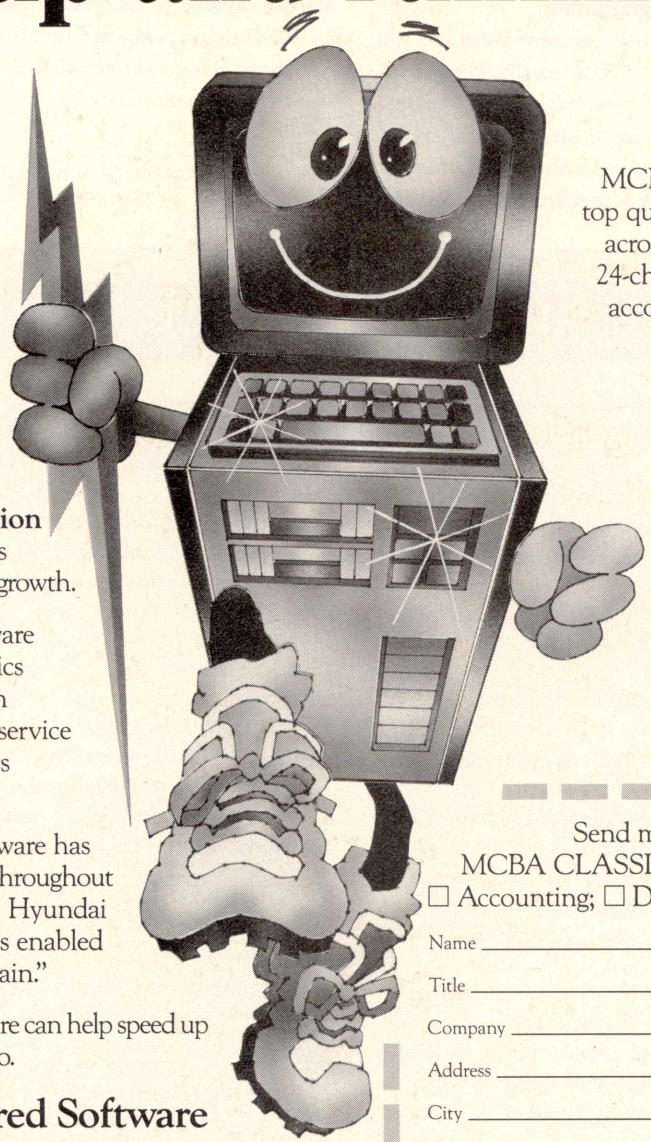

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tend to vary from country to country. With non-MAP technology, different FFDs imply different I/O protocols and different programming techniques and thus, substantially different applications. MMS/MAP 3.0 with its single programmatic interface for all FFDs eliminates the need for reprogramming.

For example, a 1,000 ft. x 2,000 ft. auto assembly plant has 100 PLCs connected to four cell controllers. Occasionally, because of a disruption in the plant or because of a manufacturing changeover, PLCs must be reloaded with their programs. With non-MAP technology the downloading requires either sneakernet or a proprietary, bit serial link protocol. By actual timing (this is a real case), hand delivery of floppies takes approximately 45 min. per PLC. Downloading via RS232 takes roughly 15 min. Downloading via MMS/MAP 3.0 takes under a minute. In this plant, lost time is *big* money: $5,000/min. MMS/MAP 3.0 is the only networking system capable of acceptable performance.

MMS delivers needed functionality with speed and reliability. MMS will increasingly drive the activities on factory floors. *—Paul Morrison is a product manager for Hewlett-Packard, Fort Collins, CO.*

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[UNDERSTANDING MMS]

To understand MMS you must understand those famous acronyms OSI and MAP. OSI, Open Systems Interconnection is the International Standards Organization (ISO) seven layer model for how the functionality of data communications systems should be partitioned. ISO's seminal thought was this: All data communications systems, whether in wide area SNA networks or local PC networks must have the following:

- There must be a means of addressing the destination node.
- Bits must be put on the transport medium in a way that will be understood by the receiving electronics.
- There must be a means of seeing that the message is delivered reliably.
- Routing algorithms must exist to define the path from source to destination.
- Data sent over the network must be formatted by known rules so that it is understood at each end of the link.

Because all communications systems provide the same basic functionality, all communications systems can be designed and built from the same basic block diagram. See the OSI model is shown in *Figure 1.*

The model assumes this: a user message will enter the communications system at the top of the stack (i.e., at the APPLICATIONS layer); the message will pass down the stack with each layer making amendments pertinent to its function; when the message passes out the bottom of the stack, it will be prepared for reliable transport to its destination.

The model offers several benefits to designers and implementers:

- The model defines areas of focus for those people writing standards.
- It allows implementers to segment development efforts.
- And, because each of the layers is modular and independent, changes can be made to one of the layers without disturbing the others.

So what is MAP? Manufacturing Automation Protocol, is a particluar instance of an OSI network specification. MAP 3.0, the latest version of MAP, specifies ISO protocols for each of the seven layers of the OSI model (see *Figure 2*). MAP 3.0 product (the result of vendors turning specs into software, firmware, modems and cables) have appeared regulary throughout 1989. MAP, of course is also the brainchild of GM and contains attributes which alow MAP nertworks to survive in harsh manufacturing environments.

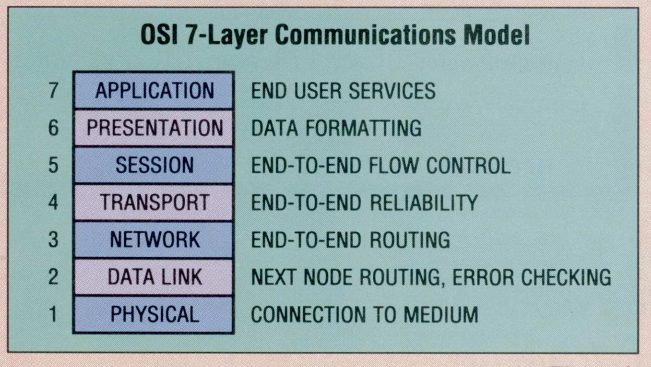

Figure 1.

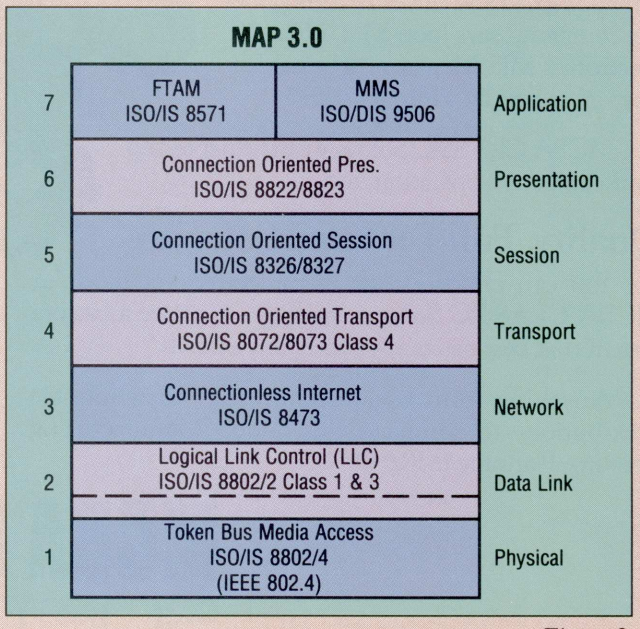

Figure 2.

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MANAGING DESKMANAGER

Fine-Tuning DeskManager In A Multivendor Environment

UTILITIES

John Enck

Editor's Note: This article represents the winning entry in HP Professional's first Call For Papers Contest. The author, John Enck, has more than 10 years experience in systems engineering and development and now serves as marketing consultant and analyst for Forest Computer Inc., Lansing, MI.

I used to be engrossed in the exploding world of PCs. Now I have returned to the land of minis and mainframes by taking on an MPE project. The project involves implementing HP's DeskManager in a multivendor environment at Forest Computer (Lansing, MI).

Although the primary purpose of implementing DeskManager at Forest was to enhance internal communications, the secondary purpose was far more intriguing. Because Forest Computer markets a multivendor networking product, the Forest Network Processor, the company also wanted to use DeskManager as the main demonstration application on the HP 3000. Forest's multivendor environment included monochrome and color versions of HP, IBM and DEC terminals, a standard monochrome Burroughs terminal, a DEC MicroVAX computer, an HP 1000 (A- Series) system, an HP 3000 (CISC model) computer, and remote access to an IBM 3090 system. Terminals could be attached directly to the Forest Network Processor or to their native hosts.

John Enck of Forest Computer Inc.

In this multivendor environment, DeskManager was to be implemented to highlight the benefits of the Forest multivendor solution. Specific implementation goals included:

- DeskManager was to be accessible from the IBM, Burroughs and DEC terminals and/or systems.
- DeskManager was to be modified to use color in its menu and message screens.
- Provisions had to be made to enable secure video handling for the block mode Burroughs and IBM terminals.

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At that point it became clear that I had to do more than simply accommodate the multivendor aspects of the Forest environment. I felt a moral obligation to accommodate the users of the product. Just because these kind, intelligent individuals were not HP literate didn't mean they deserved to be abused. After all, some of my best friends have never heard of MPE.

Although I had a great deal of trouble getting the mental images of those menus out of my mind, I realized I had to define a screen structure that could be applied to Forest's mixed vendor

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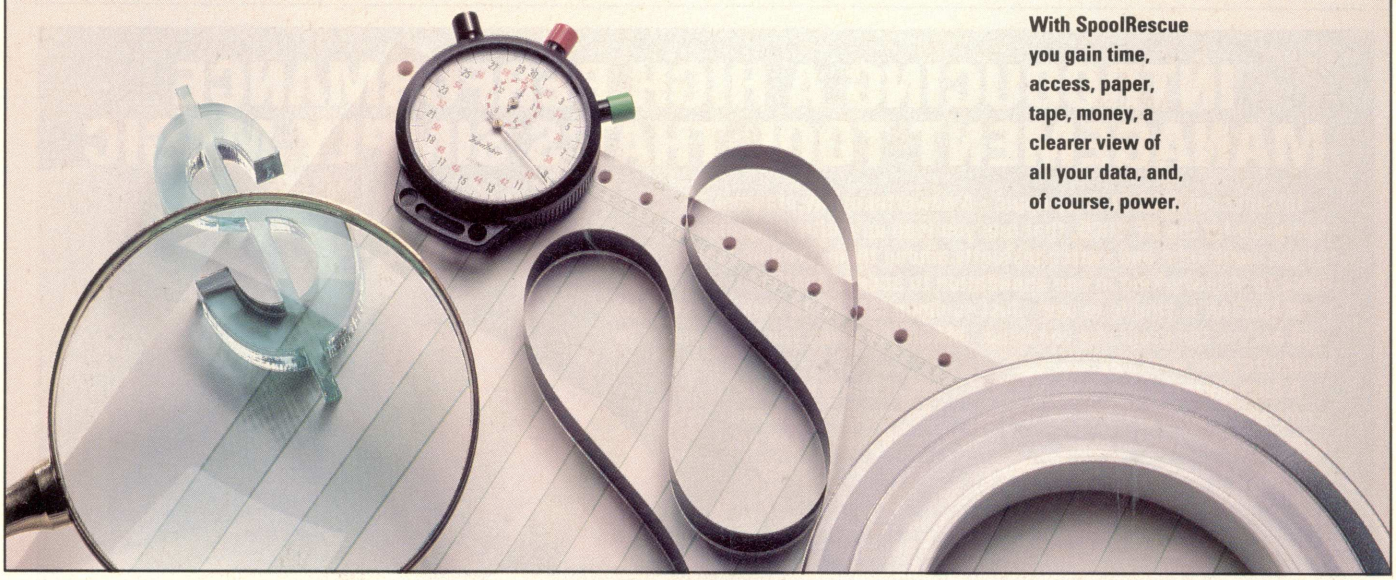

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FIGURE 1

You are: !1
(at !4 on !3 at !2)

Main Menu Commands

INTRAY (read your mail)	SIGNOFF (return to MPE)
OUTTRAY (find lost msgs)	HELP (help on HPDesk usage)
PENDING TRAY (track msgs)	? (help on HPDesk commands)
WORK AREA (edit files/docs)	NEWS (show bulletin board)
FC (Filing Cabinet storage)	STATUS (TRACKed msg status)
CALENDAR (appointments, todo)	ADMINISTRATION (password)
SEND (compose/send a message)	LISTAREA (private dist.)

FIGURE 2

In Tray Commands

READ # (read msg "#")	LIST (list all msgs)	? (full command help)
DELETE # (delete "#")	REPLY # (reply to "#")	NEWS (bulletin board)
SEND (send a new msg)	SIGNOFF (exit/bye)	STATUS (of msgs sent)

environment before I redefined the screen contents.

Out Of The Frying Pan

The good news was that the Forest Network Processor (FNP) was going to handle 95 percent of my headaches. The FNP would perform the block mode emulations required for the profile forms and full-screen editor to work on the DEC, Burroughs and IBM terminals. Additionally, the FNP would provide the physical and logical links between the foreign terminals/computers and the HP 3000.

But some things that the FNP would not do were (a) put color in a product that wasn't designed to handle it, (b) redesign the screens for the proper esthetics, and (c) handle secure password entry.

Finally, I took that last desperate step and actually read the manuals. Although most of this effort was a waste of time because the manuals spent a great deal of time explaining the obvious (and ignoring the sublime), I did come upon one starting and earth-shaking realization — HP DeskManager could be customized!

Now, I started scheming. Certainly, I had no fault with IMAGE being at the core of the product. I had worked with IMAGE many times in the past. My disillusionment with the product was clearly focused on the user interface. And, I concluded, I could easily change that by adding custom screens and commands. I could remake HP DeskManager in the image of my choice!

No Kicking, No Scratching

I began working on the appearance of the screens. This work was done in two phases: First developed the multivendor guidelines and then defined the contents. The multivendor guidelines I created are as follows:

- A line should not exceed 79 characters

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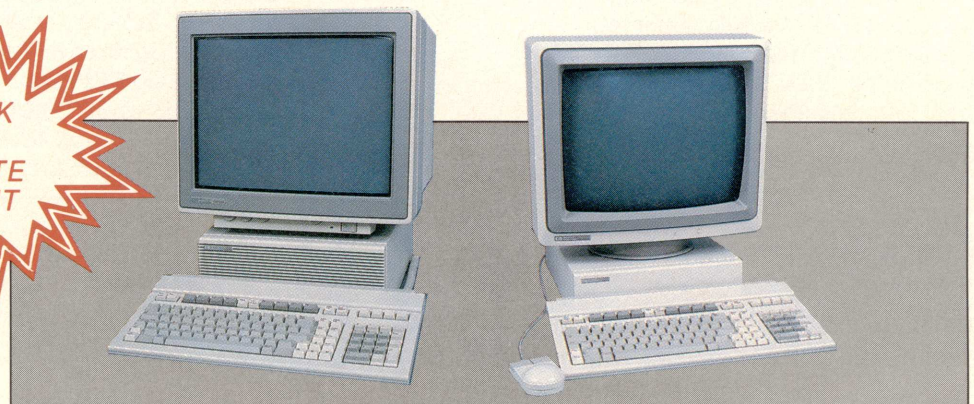

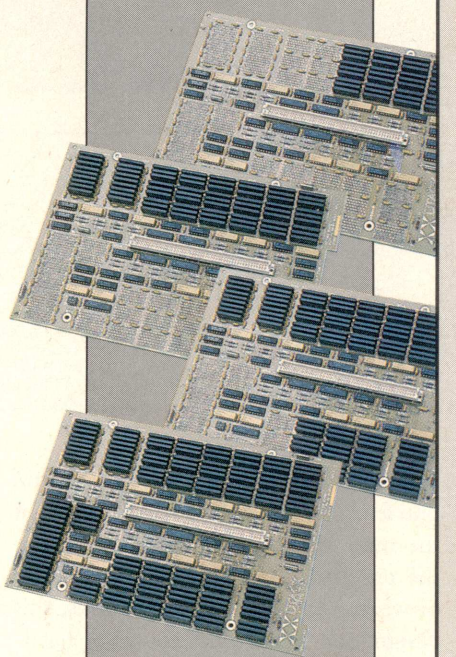

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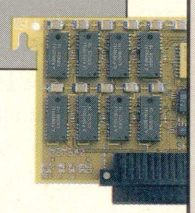

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FIGURE 3

```
~&v3SYou are: !1
~&v1S          (at !4 on !3 at !2)
~&a+9C~1
I~&v2S ——————————— Main Menu Commands ———————————
I~&v6SINTRAY ~&v5S(read your mail)          ~&v6SSIGNOFF ~&v5S(return to MPE)
I~&v6SOUTTRAY ~&v5S(find lost msgs)         ~&v6SHELP ~&v5S(help on HPDesk usage)
I~&v6SPENDING TRAY ~&v5S(track msgs)        ~&v6S? ~&v5S(help on HPDesk commands)
I~&v6SWORK AREA ~&v5S(edit files/docs)      ~&v6SNEWS ~&v5S(show bulletin board)
I~&v6SFC ~&v5S(Filing Cabinet storage)      ~&v6SSTATUS ~&v5S(TRACKed msg status)
I~&v6SCALENDAR ~&v5S(appointments, todo)    ~&v6SADMINISTRATION ~&v5S(password)
I~&v6SSEND ~&v5S(compose/send a message)    ~&v6SLISTAREA ~&v5S(private dist.)
I~&v2S ——————————————————————————————————————
```

Legend:
~ = Esc
I = Tab

FIGURE 4

```
~&v2S ——————————— In Tray Commands ———————————
~&v3S  READ # (read msg "#")    LIST (list all msgs)      ? (full command help)
~&v3S  DELETE # (delete "#")    REPLY # (reply to "#")    NEWS (bulletin board)
~&v3S  SEND (send a new msg)    SIGNOFF (exit/bye)        STATUS (of msgs sent)
~&v2S ——————————————————————————————————————
```

Legend:
~ = Esc
I = Tab

in length. Handling a carriage return/line feed after an 80th character is one of the most annoying differences between the terminals. Rather than create other provisions to handle the variations, this design rule eliminated countless headaches.

■ Whenever possible, a static (non-scrolling) screen shouldn't exceed 23 lines. The extra lines were left free in order to accommodate function key displays on those terminals that were not equipped with a special display area. Although the FNP allowed for screens longer than 23 lines, this decision was made solely on the basis of good taste and esthetics.

■ Avoid using blank reverse video as a highlighting technique. For one thing, the starting and stopping of inverse fields on any given line has different rules between terminals, and the spacing between lines is also different. For example, a solid block of inverse video on an HP terminal appears as a series of horizontal reverse video lines on an IBM terminal.

■ Avoid using bright/dim video attributes to highlight key phrases. The HP terminal is uniquely opposite to the other terminals in its handling of bright/dim.

■ In determining the color pairs to be used on the screens, the most important step was to test all the possibilities on all of the screens. By doing this, undesirable and/or unreadable color combinations were eliminated. The result? The color pairs in *Table 1* were ruled acceptable.

A sixth rule was added later when HP DeskManager began producing annoying "line length exceeded" messages on some of the more complex screens:

■ Use tab settings and tabs to eliminate blank spaces in screens. All of the terminals support tab sets and tabs.

A Flash From The Past

Having defined the overall rules of screen design, I started to work on the screen contents. Given the immediate audience

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TABLE 1

Color Pair	HP Escape Sequence
White text on black background	Escape & v 0 S
Red text on black background	Escape & v 1 S
Green text on black background	Escape & v 2 S
Yellow text on black background	Escape & v 3 S
Magenta text on black background	Escape & v 5 S
Cyan text on black background	Escape & v 6 S

TABLE 2

MAINMENU	Fixed ASCII file	Contains the menu (help information) to be displayed at the initial (level 0) tray
MSGHEAD	Fixed ASCII file	Contains the format for the header information displayed in conjunction with messages.
REPHEAD	Fixed ASCII file	Contains the format for the header displayed with replies.
WELCOME	Fixed ASCII file	Contains the "welcome" screen sent and displayed prior to signon confirmation.
INITHELP	VPLUS forms file	Contains the menus displayed at each tray. Unlike the other files, multiple displays are

TABLE 3

UDC	Command Syntax
MYMAIL MAIL	NEWMAIL <user name> HPDESK TRAY=1;USER=<user name>

of executives, sales persons and secretaries, as well as the indirect audience of potential FNP customers, I chose a type of menu that was known to all of them: a WordStar-like command assistance menu.

The advantages of this type of menu was its acceptance by the users and its relatively efficient ability to condense important command information into a relatively small amount of space. When coupled with color, many of these screens actually were quite attractive.

The disadvantage of these screens were the amount of terminal display space they occupied. The main menu, for example, occupied nine lines of the display. The secondary menus occupied no more space than the optional HP-supplied help menus (five lines), but, in my scheme, each DeskManager user was configured to have a menu invoked for every tray.

Figures 1 and *2* show the main menu and one of the tray help menus created under these design rules.

When Worlds Collide

Having designed the screen contents under the rules, the next problem was how to put the two together and create these multicolor, multivendor screens. The complexity of this operation centered on placing control character strings into the screens without offending MPE or DeskManager.

First, I focused on the files in the MAILCONF.HPOFFICE account that I would be modifying and what their relationships to DeskManager and MPE were (see *Table 2*).

I chose to deal with all of the fixed ASCII files in the same manner. I used Walker Richer & Quinn's Reflection software to upload the files to my PC (XT) where I had ample tools to transform them and then download the final results to the HP 3000. The INITHELP file, on the other hand, required special handling that will be discussed later.

Tools Of The Trade

Once the files were loaded onto my PC, I had a wide variety of tools to choose from. Specifically, I needed the Norton Utility. I always used NU to "check out" files prior to loading them into any editing system. Specifically, I looked for imbedded control characters and CTRL-Z sequences that many MS-DOS programs recognize as an end-of-file marker when, in fact, that may not be the case.

I also needed the Whisper Editor. WED doesn't interpret any control characters and allowed me to insert control charac-

Perhaps the greatest testimony to the changes occurred when one experienced HP 3000 user failed to recognize the product as DeskManager at all.

ters and sequences directly into these files. Although at first this seemed highly efficient, I later moved to a two-step process.

During the first round of modifications, I entered the exact control sequences into the file using WED. The most common sequences I used were the color setting sequence previously listed and tab operations. *Figures 3* and *4* show two menus with the imbedded control sequences.

After I changed the files I reloaded them to the HP 3000 for integration testing. This process worked well up to the point where I needed to begin documenting my trail of changes.

When I wanted to print out any of the forms I had created using this process, the printer would either swallow or object to the escape character and/or escape sequence I was embedding in the text. So to smooth out my development and testing operation, I began using a tilde character (~) in place of the escape character and then wrote a small conversion program to replace the tilde with an escape and vice versa. The source code for these programs are listed in *Programs 1* and *2*.

Note in *Program 1* that lines 155 and 225 aren't integral to the program. They show the progress of the program by displaying an explanation mark for every record (256 bytes) read and a period for every escape converted to a tilde. For larger files, this visible indication of progress is much preferred to a blank screen.

Also take note that the only substantial difference between the two programs lies in lines 200 and 220. In line 200, the presence or absence of the source character is detected. In line 220, the source character is replaced by the target character.

This process then gave me even more flexibility in dealing with the files. I could now use WED, WordStar, WordPerfect, or any text editor to massage and print my data. The conversion program would handle the final format changes. The fact that these programs are written in inter-

TILDESC.DOC

Program 1.

```
10 print
20 print "Escape converter - changes escape to tilde (~)"
30 print
40 input "What name did you give the input file";i$
50 if len(i$)=0 then goto 40
 .
 .
 .
155 print "!";
160 x=len(inbound$)
170 y=1
200 y=instr(1,inbound$,chr$(27))
210 if y=0 then goto 300
220 inbound$=left$(inbound$,(y-1))+"~"+right$(inbound$,(x-y))
225 print ".";
230 goto 200
300 outbound$=inbound$
310 print#2,outbound$
 .
 .
 .
```

TILDESC.DOC

Program 2.

```
10 print
20 print "Tilde converter - changes tilde (~) to escape"
30 print
40 input "What name did you give the input file";i$
50 if len(i$)=0 then goto 40
 .
 .
 .
155 print "!";
160 x=len(inbound$)
170 y=1 200 y=instr(1,inbound$,"~")
210 if y=0 then goto 300
220 inbound$=left$(inbound$,(y-1))+chr$(27)+right$(inbound$,(x-y))
225 print ".";
230 goto 200
300 outbound$=inbound$
310 print#2,outbound$
320 goto 150
500 close #1
 .
 .
 .
```


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CIRCLE 131 ON READER CARD

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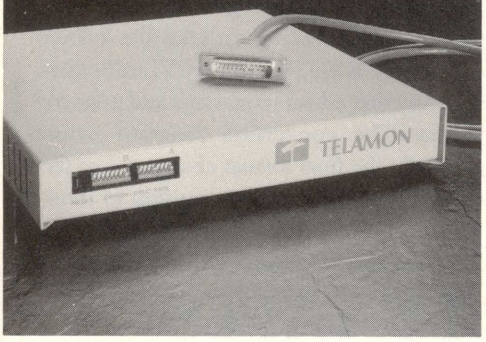

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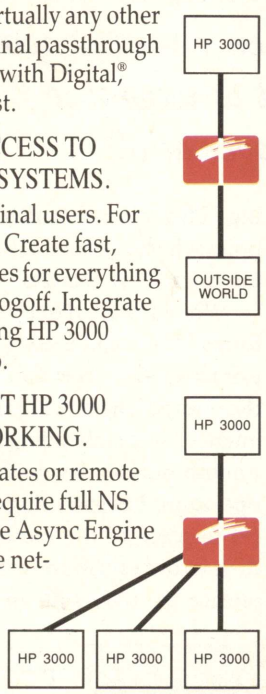

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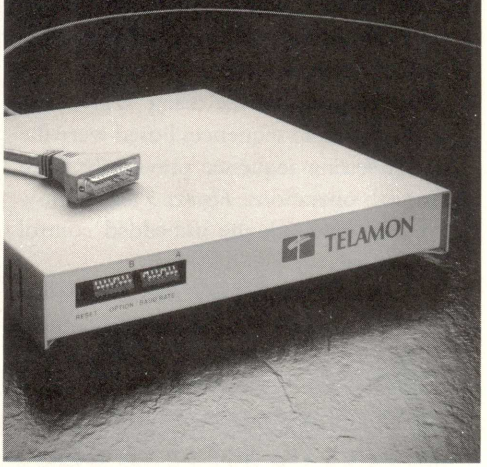

pretive BASIC isn't a testimony to my love for the language — rather it was a painful reality for me because our company lacked DOS-oriented compilers.

Special Strokes For Special Folks

Because the INITHELP file contained VPLUS-specific information and was oriented to that purpose (as revealed by NU), the same procedures couldn't be applied to that file. Instead, I used the procedures described in the HP documentation to modify the help information.

After I redesigned each menu to conform to my overall screen specifications, I entered in the escape sequences into the text of the menu using the tilde character (~) again to represent an escape. Once I had altered the menus to my satisfaction I simply uploaded the file to my PC as a binary file, and then ran my tilde conversion program on it.

I had to be careful in downloading the file back to the HP 3000, however, because it was tagged as a VPLUS file by an MPE file code. So to keep all subsystems happy, I first used FCOPY to make a copy of the original file, then I downloaded the file from my PC into a fresh (new) file, and then used FCOPY again to load the new file into the old file, thereby preserving the file codes.

Without question, the most boring and time-wasting part of the process was the implementation of secure video for password protection. The difficulty of this part rested in the fact that it all had to be done by hand using cumbersome (as compared to the PC) MPE tools.

In order to implement secure video in the Forest environment, I had to imbed the "SUB" control character in each message where I wanted a secure field to begin. Unfortunately, all of these messages are contained in the MAILCAT.-MAILLIB.HPOFFICE catalog file and the size of the file prohibited (in my mind) downloading it to the PC and using PC-based utilities on it. Instead I was forced to use the HP Disk Editor (DISKED.PUB.SYS) to search out for these messages and patched in the control character. This was an ugly process that should not be undertaken by the fainthearted.

All Systems Gorgeous

With my redesigned and colorized screens firmly in place, I was almost ready to turn the users loose. But first I had to make a few adjustments to the MPE side.

To make matters simple, I customized a command for each user that allowed them to sign on without the necessity of supplying a user name and also gave them a command to check their IN TRAY without invoking DeskManager (see *Table 3*).

I also took the liberty to force the NEWMAIL command during the logon

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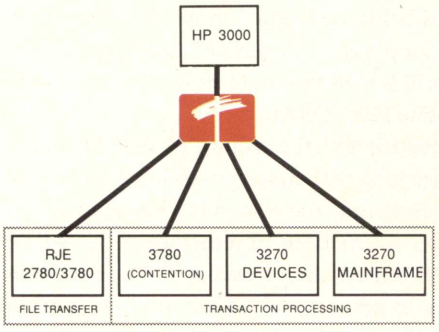

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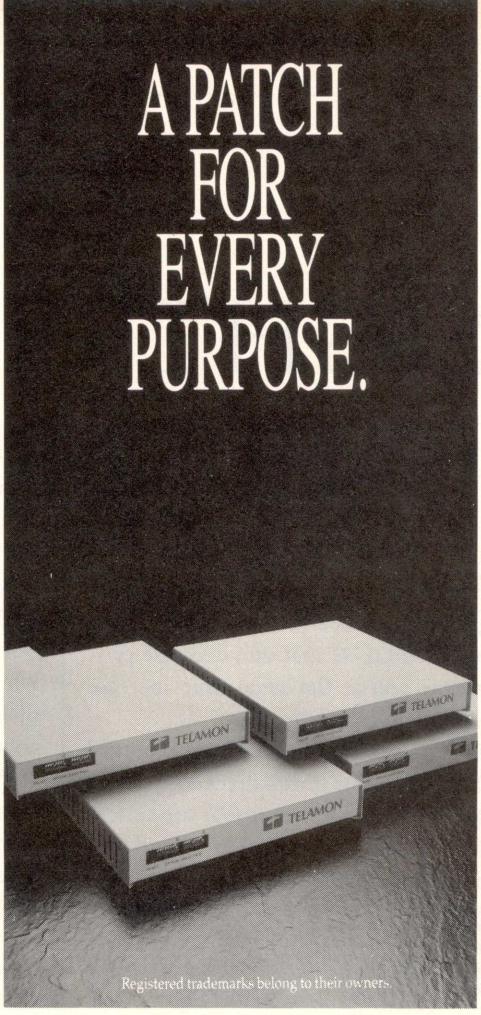

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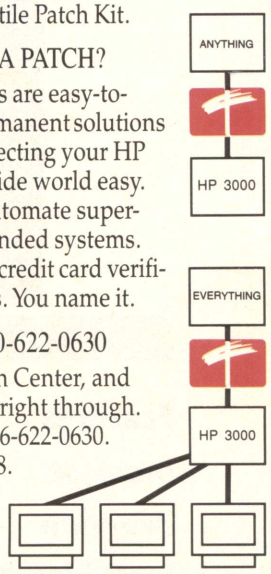

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CIRCLE 155 ON READER CARD

UDC processing. Although this added a delay in the logon process (from their perspective), it forced them to confront the reality of DeskManager on a daily basis. Putting DeskManager in front of them as much as possible was critical during the early acceptance period.

In addition to supplying the username to DeskManager, I also sent the user into the IN TRAY as the default, logged-in tray. I took this step because I didn't want to expose the users to the wide variety of trays so early in the game. In fact, to reinforce this, I also created a variety of custom DeskManager command scripts that performed many of the usual activities done outside of the IN TRAY and these scripts always returned to the IN TRAY upon completion.

Unimpressed with the user documentation, and given the amount of customization I performed, I took one last step. I created custom documentation for the beginning and intermediate user. This step saved me from doing formal training sessions and allowed for first-time users to get a quick introduction to the system.

And In The End, A New Beginning

The revised form of HP DeskManager was released for Forest Computer's use without a great deal of fanfare and without formal training. Initial release was limited to the sales and marketing organizations, with the rest of the company following after a few initial shakedowns.

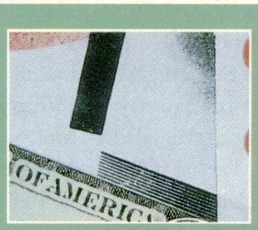
Based on a quick flurry of electronic activity (not to mention the contents of my IN TRAY), initial acceptance and use of DeskManager for sending and receiving messages was excellent. There was a marked decrease in the number of both formal and informal meetings, and the regular lines of people waiting outside the doors of the CEO and executive managers dwindled and, in some cases, actually vanished.

Equally important, this was not accomplished at the cost of my ear. I was initially very concerned that the intentional absence of formal training would only result in around-the-clock phone calls. But this was not the case — the menus coupled with customized commands and augmented by designer documentation did the trick. The only area of confusion was in the FILING CABINET.

Outside of Forest Computer's corporate usage, the revised DeskManager was used as part of Forest's multivendor demonstration at the 1988 Interex in Orlando, FL. Perhaps the greatest testimony to the changes occurred when one experienced HP 3000 user failed to recognize the product as DeskManager at all. He was convinced that he was seeing some flashy, do-nothing program that Forest's marketing department had put together.

NSIGHTS INTO COBOL85

Features Increase Program Legibility And Efficiency



LANGUAGES

James Richard

COBOL85 has been with us for some time now. However, there have been several new features added (from COBOL74) that will decrease programming time and at the same time increase program legibility and efficiency.

In COBOL85, the number of bytes in record description layouts must match the record size of the file label. You will get an error at run time if your file label record size was 80 bytes and you had the following in your program:

```
01 INPUT-RECORD-LAYOUT.
    05 INPUT-FIELD-1              PIC S9(4).
    05 INPUT-FIELD-2              PIC X(5).
    05 INPUT-FIELD-3              PIC X(61).
```

COBOL85 also gives you the option of specifying whether the UNTIL condition of a PERFORM statement is tested before or after the statements have been executed. The default is to check the condition of the PERFORM before the set of statements is performed. Thus, the set of statements may be performed zero or more times. The order of processing is:

1. Initialize the counter if you're using the VARYING phrase.
2. Check the condition. If true, transfer control to the next executable statement after the PERFORM. If not true, execute the specified set of statements.
3. Increment the loop counter and return to No. 2.

If you're sure that you want to perform the statements at least once, you must add the WITH TEST AFTER phrase to the PERFORM statement.

COBOL85 has given you an in-line PERFORM statement. This option allows code to be "performed" without having to branch to another part of the program. This especially is useful and more efficient when a set of instructions is being performed more than once (e.g. when looping). For example, in *Program 1* out-of-line PERFORM is more efficiently coded with an in-line PERFORM.

Note that with the in-line PERFORM, there's no branching. When an out-of-line PERFORM is encountered, the computer has to generate machine instructions to remember from where the PERFORM is being executed. The computer also has to generate and utilize machine instructions telling it how to "get to" the module being performed and how to "get back" to the original location. (This all actually happens at compilation time). Using In-line PERFORMS eliminates these extra instructions and is thus more efficient.

The INITIALIZE statement can be used to set numeric data items to zeroes or alphanumeric data to spaces. The statement has the following format:

```
INITIALIZE data-item-1 REPLACING data-class by
      data-item-2 or literal-1

where:
        data-item-1 is the receiving field
        data-class is one of the following:
                          ALPHABETIC
                          ALPHANUMERIC
                          NUMERIC
                          ALPHANUMERIC-EDITED
                          NUMERIC-EDITED
      data-item-2 represents the sending field.
```

Everything after data-item-1 is optional. The simplest and probably the most common use for the INITIALIZE statement would be like this:

```
01 PROGRAM-ACCUMS.
    05 ACCUM1          PIC S9(9)V99 COMP SYNC.
    05 ACCUM2          PIC S9(9)V99 COMP SYNC.
    05 SWITCH1         PIC X.
    05 SWITCH2         PIC X(3)
PROCEDURE DIVISION.
    INITIALIZE PROGRAM-ACCUMS.
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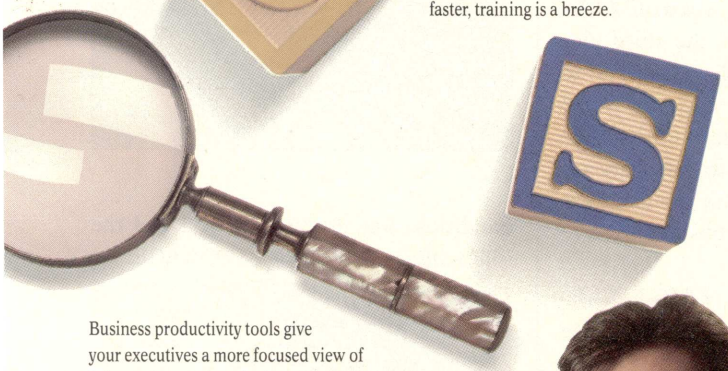

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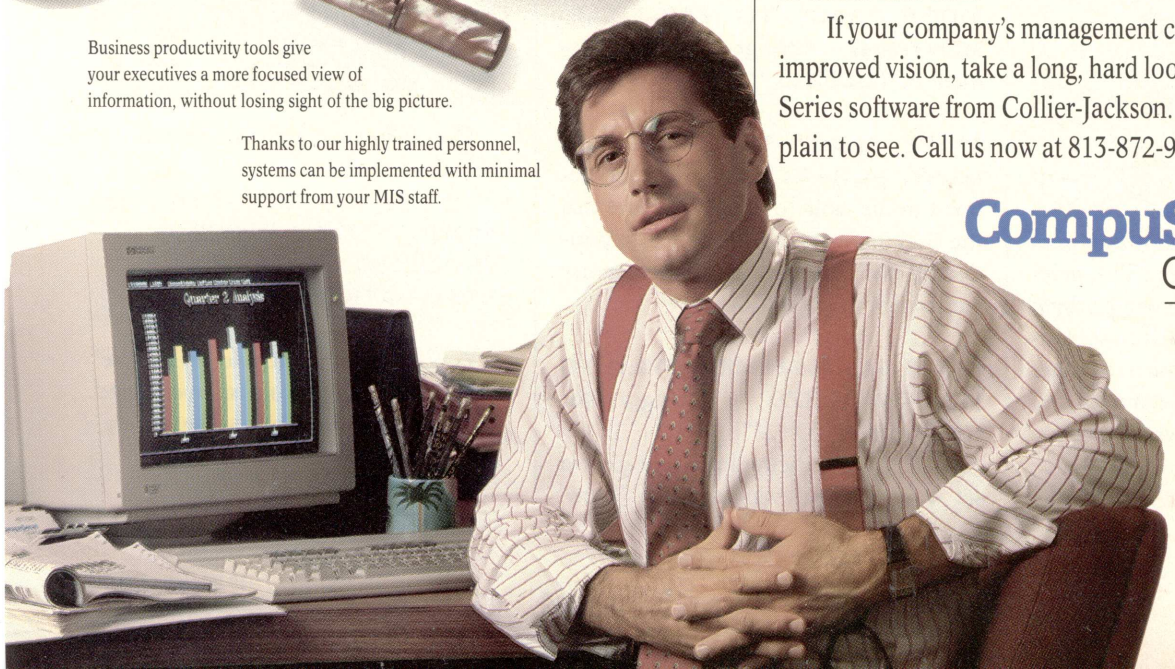

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HP 3000 NATIONAL PROGRAM

CIRCLE 164 ON READER CARD

After the INITIALIZE, the three accumulators would be set to zero and the two switches set to spaces. This statement is executed as if a series of MOVE statements had been written. The receiving item of each move is always an elementary item, even if data-item-1 refers to a group item.

The EVALUATE statement adds additional multicondition case processing. This statement saves confusing nested *ifs* and *elses*. Code then is easier to read and write. The format of EVALUATE is in *Program 2*.

The ALSO phrases and the WHEN OTHER phrase are optional. A few examples will help: Suppose you had the following in WORKING STORAGE:

```
01 PLAYER-INFORMATION.
    05 YEARS-PLAYED              PIC S9(4) COMP SYNC.
    05 STILL-PLAYING             PIC X.
```

The following EVALUATE could save a messy nested *if*:

```
EVALUATE YEARS-PLAYED ALSO STILL-PLAYING
      WHEN > 20 ALSO ANY
          PERFORM LONGTIME-PLAYER
      WHEN < 1 ALSO "Y"
          PERFORM FIRST-YEAR-PLAYER
      WHEN < 20 ALSO "N"
          PERFORM RETIRED-PLAYER
      WHEN ANY ALSO "Y"
          PERFORM ACTIVE-PLAYER
      WHEN OTHER
          PERFORM INVALID-PLAYER.
```

Another example would be as follows:

```
01 GRADE-INFORMATION.
    05 GRADE                     PIC 9(4)V9(2).
    05 ACADEMIC-LEVEL            PIC 9(4).

          EVALUATE GRADE > 3.5 ALSO ACADEMIC-LEVEL
                WHEN TRUE ALSO 1 THRU 4
                   PERFORM HONORS-STUDENT
                WHEN TRUE ALSO NOT 1 THRU 4
                   PERFORM SPECIAL-STUDENT
                WHEN FALSE AND 3
                   PERFORM CHECK-ACADEMIC-LEVEL
                WHEN OTHER
                   DISPLAY "INVALID STUDENT"
                   PERFORM READ-STUDENT-MASTER
          END-EVALUATE.
```

Another thing COBOL85 makes possible is reference modification. That gives you the ability to reference data by byte position. By specifying the leftmost character position and the number of bytes you want to reference, you can reference any part of any data item whose usage is

Program 1.

```
    Out-of-line PERFORM:

PERFORM ADD-TO-ACCUMS VARYING SUBSCRIPT FROM 1
    BY 1 UNTIL SUBSCRIPT > 50.

ADD-TO-ACCUMS.
    ADD INPUT-FIELD-1 TO WS-ACCUM1(SUBSCRIPT).
    ADD INPUT-FIELD-2 TO WS-ACCUM2(SUBSCRIPT).

    In-line PERFORM:

PERFORM VARYING SUBSCRIPT FROM 1 BY 1 UNTIL
    SUBSCRIPT > 50
          ADD INPUT-FIELD-1 TO WS-ACCUM1(SUBSCRIPT)
          ADD INPUT-FIELD-2 TO WS-ACCUM2(SUBSCRIPT)
END-PERFORM.
```

display. The data item may by qualified or subscripted. As an example, suppose you had the following in WORKING-STORAGE:

```
01 WS-TABLE.
    05 TABLE-ELEMENT                 PIC X(5)
              OCCURS 5 TIMES         VALUE "12345".
01 WS-HOLD-FIELD                     PIC X(3).
```

The following statements would have the following results:

MOVE "ABC" TO TABLE-ELEMENT(3)(2) — Changes the third element of the table TABLE-ELEMENT to "1ABC". Note that the 3 in the move represents the third element in the table and the 2 represents the leftmost character to be referenced. Because no length is specified, the length defaults to 3 (ABC).

MOVE "ABC" TO TABLE-ELEMENT(2)(4) — Changes the second element of the table to "123AB".

MOVE "ABC" TO TABLE-ELEMENT(1)(1:4) — Changes the first element in the table to "ABC 5". Note that the (1:4) indicates the leftmost byte position is position one and the reference extends for four positions.

MOVE TABLE-ELEMENT(5)(2:2) TO WS-HOLD-FIELD. — Changes WS-HOLD-FIELD TO "23".

The SET statement can now be used to set a conditional variable to a "true"

Program 2.

```
          [identifier-1]  [   [identifier-2]  ]
          [literal-1    ]  [   [literal-2    ]  ]
EVALUATE  [expression-1 ]  [ALSO [expression-2]  ]
          [TRUE         ]  [   [TRUE         ]  ]
          [FALSE        ]  [   [FALSE        ]  ]

WHEN
[ ANY                                                ]
[ condition-1                                        ]
[ TRUE                                               ]
[ FALSE                                              ]
[    [identifier-3    ]  [       [identifier-4    ]  ]
[NOT [literal-3       ]  [THROUGH [literal-4       ]  ]
[    [arithmetic-exp-1]  [THRU   [arithmetic-exp-2]  ]
[                                                    ]

ALSO
[ ANY                                                ]
[ condition-2                                        ]
[ TRUE                                               ]
[ FALSE                                              ]
[    [identifier-5    ]  [       [identifier-6    ]  ]
[NOT [literal-5       ]  [THROUGH [literal-6       ]  ]
[    [arithmetic-exp-3]  [THRU   [arithmetic-exp-4]  ]
[                                                    ]

    Imperative-statement-1
WHEN OTHER
    Imperative-statement-2
END-EVALUATE.
```

condition. For example, if you had the following in WORKING-STORAGE:

```
01 PROGRAM-SWITCHES.
    05 ALL-RECORDS-PROCESSED              PIC X.
              88 ALL-PROCESSED            VALUE "Y".
              88 NOT-ALL-PROCESSED        VALUE "N".
```

The following two statements are equivalent:

MOVE "Y" TO ALL-RECORDS-PROCESSED. SET ALL-PROCESSED TO TRUE.

You can't set a variable to a "false" condition. The following isn't permitted:

SET ALL-PROCESSED TO FALSE.

You would have to set not-all-processed to true.

COBOL85 also allows use of the BY CONTENT phrase to pass specified parameters to and from called programs. If

A CLASS clause creates a user defined class and assigns values.

BY CONTENT is specified or implied for a parameter, the called program cannot change the value of the parameter as referenced in the call statement's USING phrase. If the called program does change the value, the calling program never sees it. The default here is BY REFERENCE, not BY CONTENT.

A CLASS clause also has been added. This feature allows you to create a user defined class and assign certain values to it. The following example will help:

```
SPECIAL-NAMES.
    CLASS VALID-GRADE IS "A" "B" "C" "D" "F"
                         |
WORKING-STORAGE.
01 GRADE-LIST.
    05 CLASS-GRADES          PIC X
        OCCURS 5 TIMES.
                         |
IF GRADE-LIST IS NOT VALID-GRADE THEN
    PERFORM ERROR-ROUTINE.
```

Finally, there are a few small things about COBOL85 that should be noted.

- The relational operator >= now can be used to express "is greater than or equal to."
- The relational operator can be used to express "is less than or equal to."
- The ENVIRONMENT DIVISION, PROCEDURE DIVISION and DATA DIVISION now are all optional.
- COBOL85 has a whole closet full of new reserved words, including DAY, DATE, REFERENCE, LENGTH, CD, ANY and DELETE. —*James Richard is a programmer analyst for administrative computer services at James Madison University, Harrisonburg, VA.*

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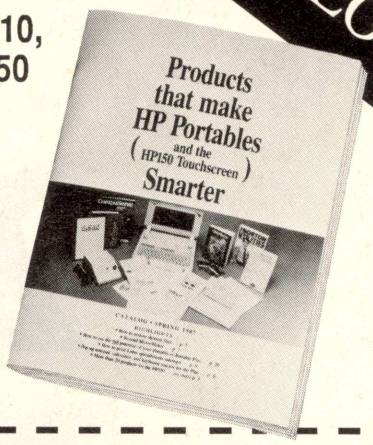

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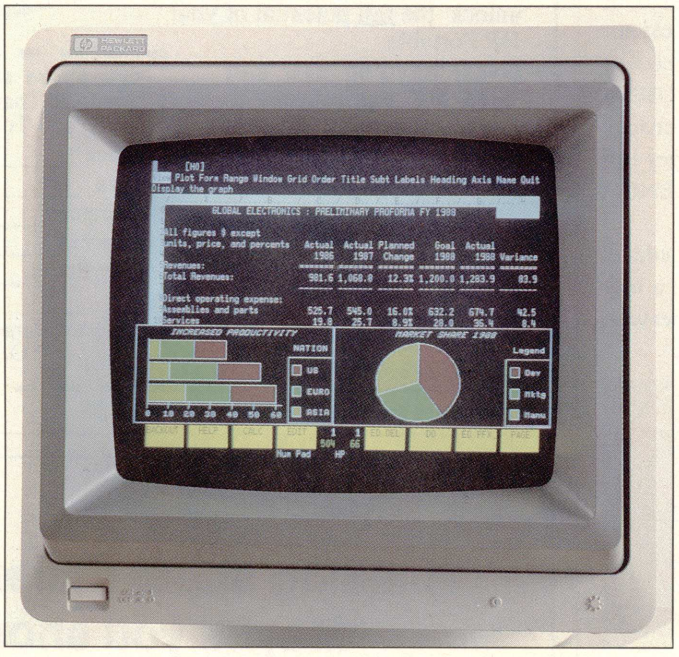
Access Technology's Spreadsheet For Multiuser Computers

20/20

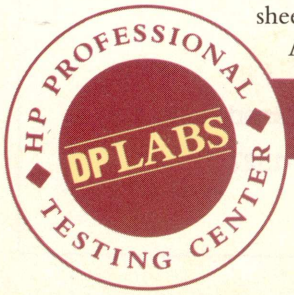


When you load 20/20 on your HP 3000, don't expect Barbara Walters or Hugh Downs to pop up on your screen. What you will get is an integrated spreadsheet environment that has the ability to distribute spreadsheet applications throughout your computer system, without relying on networked PCs.

There's also a companion PC-based 20/20 that has the same command syntax as 20/20 for your 3000. This can add flexibility and power over standalone spreadsheets like Lotus 1-2-3.

As a matter of fact, most of the LOTUS functions are available in 20/20. Even with the PC version, you can take a LOTUS worksheet file and translate it into 20/20 format. This helps if you need to convert external files into 20/20 syntax. Any non-supported function produces an error message that you easily can find and manually correct. Another difference is the row numbers — 20/20 starts at zero. Because the PC version is the same as the HP version, distributing applications is easier and confusion can be significantly reduced.

A feature I liked was the goal seeker



Del Lukens

function. This allows you to enter a formula in one cell, the desired result in another cell, and then wait for the program to alter a range of data cells in order to match the desired result. I entered a very simple three cell addition formula, A1+A2+A3. The cells contained 1, 2 and 3 respectively and the desired result of 8. 20/20 took only a few iterations and altered cell A1 to 3 in order to satisfy the goal.

Another nice feature is Timechart. Using this tool you set up a project model by task sequence and unit of time required to perform the task. Timechart then calculates three elements:

- Start: The earliest time each task can begin.
- End: The time of completion for each task.
- Slack: The amount of time that a particular task can be delayed without affecting the task which follows. If you can remember operations management this is called the "critical path."

This is basically a neat little PERT chart application built in to the 20/20 product.

20/20 supports graphing from your spreadsheet, but you need a graphics terminal to display graphs. The window option allows you to display up to four graphs at once. There are six different types of graphs available: Line, Pie, Bar, Comparison, Stacked and XY. You can display vertical bar graphs or horizontal bar graphs. The direction can be specified for Line, comparison and stacked graphs as well. A plot file can be generated if you have a plotter connected to your system, or you can plot online if you wish.

There are quite a few storage options available with 20/20. Two worthwhile features are STORAGE LINK and STORAGE JOURNAL ECHO. The former allows you to combine data from other worksheets while the latter stores keystrokes for later inclusion as a macro. The file may need editing before use, and you can use any text editor for this process.

Cursor Control Keys

I found the command set and key strokes required to navigate through the spreadsheet rather clumsy and awkward. You don't use the cursor control keys for anything. Rather, the function keys F5 through F8 are used to move the cell pointer. I suppose it isn't fair to compare a host-based spreadsheet to a PC-based product, but having worked with LOTUS extensively, it was very difficult for me to keep my hands off the arrow keys on my keyboard. The keys did move the cell pointer after pressing the enter key, which only added to my frustration because it didn't go where I expected it to. Moving the cell pointer off the screen causes the entire screen to be repainted. At 9600 BPS this isn't bad, but noticeable nonetheless. I can't imagine running this software remotely over a 1200 BPS modem.

The 20/20 command syntax is similar to LOTUS, using the slash key for the prefix followed by one letter keystrokes, or pointing to the keyword on the command line. One noticeable difference is in the use of functions. You don't need the @ character for any of the built-in functions. For example, to sum the cells in column C for rows 1 through 5, just enter "SUM(C1.C5)".

Installing 20/20 on the Series 37 took longer than it should have. Although the documentation was quite clear, the installation procedures didn't perform exactly as written. For example, the installation job stream supplied on tape aborted because of some extraneous characters in several lines. When I fixed the offending line, another line had the same problem. Finally, not wanting to waste further time, I manually entered the MPE commands that altered the capabilities and access parameters of the account and group.

20/20 can make a valuable contribution to commercial applications installed on your 3000.

Then, when I tried to run the package, it required a larger code segment than our 3000 had configured. This made it necessary to reconfigure the max code segment size during a cold load from tape. I don't know why our machine was configured with only 12k, but after we expanded it to the maximum 16k, the program ran fine. This isn't documented anywhere, and added to our confusion.

I don't care to dwell on the negative side, but 20/20 takes a long time to load and run. On average, with a dedicated machine, it took two minutes from the time we issued the run statement until the screen was presented and paused for input. Allocating the program didn't help much, although it did speed up a little.

20/20 can make a valuable contribution to commercial applications installed on your 3000. If integrated spreadsheet distribution is your goal, then check out 20/20. There are trade offs of course, but the inconvenience of start up time and refresh rate could be offset by a corresponding increase in end-user satisfaction and effectiveness. The common interface between the PC version and the 3000 version makes 20/20 an attractive solution to distributed computing problems.

20/20 Integrated Spreadsheet Modeling Program

SYSTEM REQUIREMENTS: HP 3000 running MPE V, XL

PRICE: $2,800-$12,800

ACCESS TECHNOLOGY

HEADQUARTERS:
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Two Natick Executive Park
Natick, MA 01760
(508) 655-1717

BRANCHES: Marlo Bucks, England; Dusseldorf, Germany; Paris, France; Zurich, Switzerland; Amsterdam, Holland; Sydney, Australia

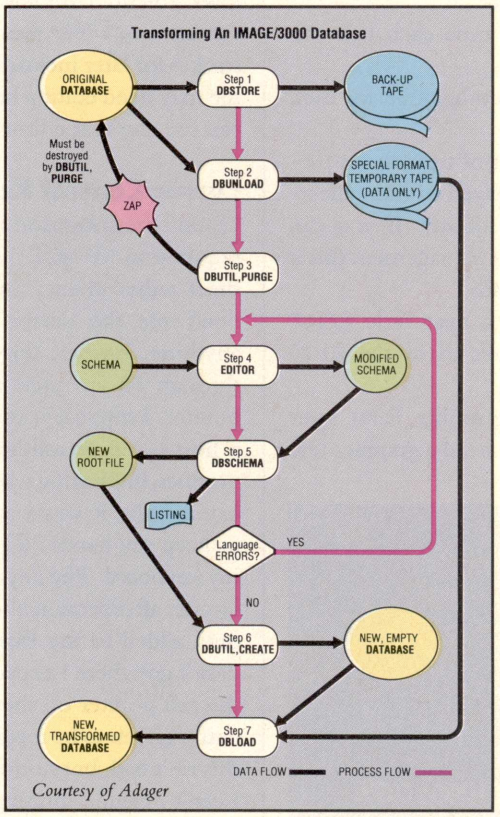
FOUNDED: 1980

PRODUCT LINE: 20/20, 20/20 Database Connection, 20/20 Word Processing Connection

CIRCLE 296 ON READER CARD

Adager

The Legendary Database Utility Is Still Going Strong



Courtesy of Adager

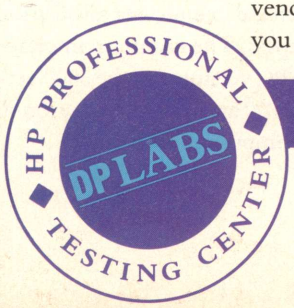
Adager, the ADApter/manaGER for IMAGE/3000 and TurboIMAGE/3000 databases, is the oldest and best known utility for performing maintenance and structural changes on IMAGE databases. (I will use "IMAGE" to mean both TurboIMAGE/3000 and its predecessor, IMAGE/3000. IMAGE/3000 and TurboIMAGE/3000 are trademarks of Hewlett-Packard for its database management system.)

A legendary product within the HP community, Adager was introduced in 1978 near the dawn of the HP 3000 era and always has had a mystique that's been the envy of HP software tool developers.

A major reason for the Adager aura is that in the earlier days of IMAGE there were only two approaches to IMAGE database transformations (capacity or structural changes) — buying Adager or using DBUNLOAD/DBLOAD and writing (perhaps in COBOL) your own data conversion programs. At that time, neither HP nor any other third-party vendor provided a tool that would allow you to easily and quickly manage and reshape your databases without risking the introduction of serious errors to either the database structure or data values.

The approach Adager pioneered allowed the programmer/analyst or database administrator to modify the database capacities or structures online, without requiring unloading and reloading of data to and from tape (except as backup) or the

Joel Martin



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writing of specialized, one-time application programs to convert from the old data structure to the new. Adager also performed its magic without requiring any information about the database except information already stored in the database root file. This eliminates the risk of introducing errors caused by any discrepancies between the database schema text file and the database in use. In addition, Adager was (and is) fast: Only those structures that need to be changed are transformed and many changes can be performed nearly instanteously.

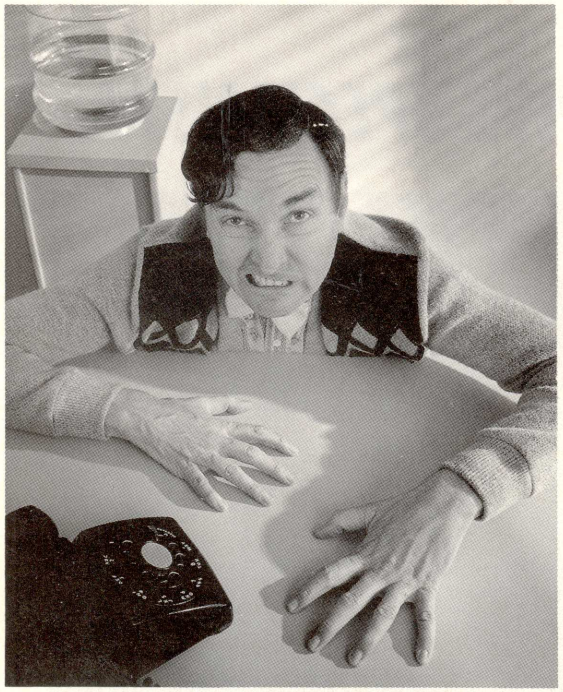
Extolling Adager

So with this celebrated history and after so many years of service to the HP 3000 user community (not to mention the strategic importance of Adager to HP) you might expect this review to add to the luster of the Adager reputation. In some ways I think I will, but Adager has proven not immune from a risk that all legends face: Their celebrated accomplishments have become larger than life and their shortcomings all but ignored.

Product Contents

The Adager product includes a small 1600 bpi reel-to-reel magnetic tape (tape cartridges also are available) and a packet of information, mostly of the marketing variety. Adager doesn't have a user or reference manual. More correctly, Adager's "Reference Manual" is a single page that describes the installation and use of the product. All product files reside in the REGO account (Adager was developed by Mr. Alfredo Rego), with the exception of a jobstream for loading the account. The DOC group of the REGO account has 23 text files. These include information on installing Adager, license and maintenance agreements, product features, hints for Adager usage, a history of changes to Adager, product description information, a description of the five contributed utility programs, etc. The total amount of information in all text files is about 40 pages. However, only a couple of those pages have information about using the Adager product.

Adager has been compatible with



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CIRCLE 179 ON READER CARD

MPE/XL since August 1987 — even before the first 900 Series CPUs were officially shipped to customers. There is and has always been only one Adager product tape, whether the target CPU is an ancient Series III running preTurbo IMAGE under MPE IV, or a new Series 955 running TurboIMAGE under MPE/XL. This is an impressive programming accomplishment but primarily benefits Adager the vendor (they don't need to support or stock different tapes for the different versions of IMAGE or MPE) and is partly because of MPE's reputation for forward compatibility.

Two Models Available

There are two versions of Adager available. To simplify your understanding of Adager, you can view all of Adager's functions as belonging to one or more of four categories: management of your databases, optimization, auditing and transformation.

Model 1 has about 20 functions and is sold for day-to-day (really month-to-month) management, optimization and auditing of your databases. Model 2 has about 34 functions (the 20 of Model 1 plus 14 unique functions) and adds to Model 1 the ability to perform major database transformations such as adding, changing or deleting data items and datasets. (In my definition, Model 1 has all the optimizing, managing and auditing functions but doesn't have Model 2's transformation functions).

- Management Functions (Models 1 & 2): Functions that I might categorize for managing your databases allow you to change a database's name, copy a database and change dataset capacities within a database.
- Optimization Functions (Models 1 & 2): Optimization functions include the ability to locate datasets on specific disc drives when the dataset is created or modified. A function to repack detail datasets to speed serial searches is provided, as is a function to change the primary path of a detail set to improve the speed of keyed searches. Master and detail datasets can have their blocking factor changed to improve disc I/O and sort paths can be added or deleted. Adager reminds you to set master dataset capacities to prime numbers (and goes so far as to suggest the primes closest to your choice of capacity) to further improve master set retrieval performance. Choosing a prime number as a master set capacity may improve the distribution of entries in the dataset thereby improving performance.
- Auditing Functions (Models 1 & 2): Adager can quickly "decompile" a database into a schema file, check that automatic master set entries have associated detail set entries, repair broken chains, describe and redefine database security at any level (database, dataset or data item) and describe selected database elements online or offline.
- Transformation Functions (Model 2 only): Adager can perform all of the fol-

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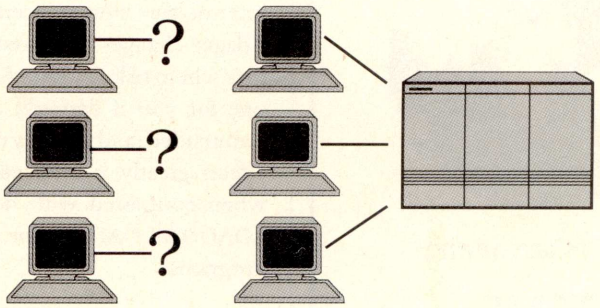

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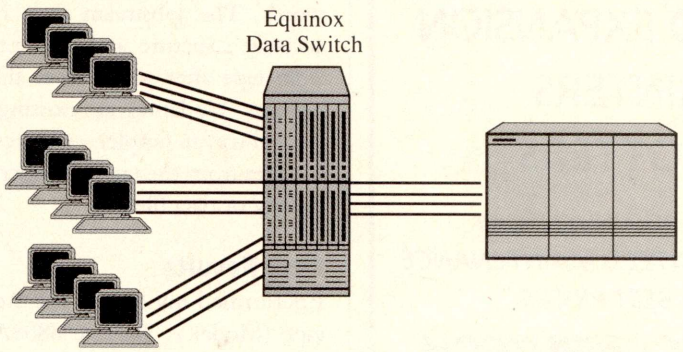

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lowing: add, delete or change fields within datasets; add, delete or change data items globally; add or delete paths between master datasets and detail datasets; add or delete datasets; add or delete sorted paths; change dataset characteristics and erase datasets.

Feature Summary

Adager's feature set is excellent. In short, Adager can change an IMAGE or Turbo-IMAGE database in nearly any way imaginable. Adager even performs illegal changes to database structure if requested, though not without warning you that the change is illegal and might have dire consequences. ("Illegal" changes can be helpful for testing and may sometimes be necessary as an intermediate step in a series of changes.) Adager changes don't require an up-to-date schema file (though Adager will build one for you if desired!) and the risk of unintended (and possibly destructive) side effects greatly is reduced or eliminated when contrasted with doing a DBUNLOAD/DBLOAD and/or writing custom programs.

Installation & Set-Up

Installation and set-up are very easy. Installing Adager for the first time is as straight forward as installing most utility software available for the HP 3000. You restore a jobstream to the PUB.SYS group and submit it to MPE after inserting passwords. The jobstream then builds the account structure and restores the files from tape after you answer the console prompt. Updating an existing copy of Adager is even simpler—just restore all of the files from the tape. (Adager keeps no history or data files.)

Test Results

I performed my tests of the Adager trial tape (Model 2, Release 8808A) on our Micro 3000 XE. As suggested in the "Reference Manual," I logged on as the account manager (in one of our test accounts) and used Adager to create a test copy of one of our test databases. True to its claim, using Adager is very simple and creating the copy of this small database (11 datasets, 15,000 sectors) took well under a minute. In all of the following tests, I was logged on as the database creator in the same group and account as my test database (an Adager requirement for most functions). I used HP's QUERY program to confirm the results of my changes.

Adager is very easy to run. (Note: I have used Adager for about 10 years so some ease of use may be a result of my familiarity.) There's a single program, ADAGER.PUB.REGO, that's executed with the MPE RUN command. At the program start-up there are a few lines of introduction that include the phone number for support and the product release number.

The large majority of functions were easy to use and performed tasks quickly and without incident. Renaming a database took only a few seconds (though I couldn't rename a database into a different group, which is easily done with Vesoft's MPEX product). Also, copying a database was a snap, and changing the capacity of detail and master datasets went off without a hitch.

I also was able to add, change and delete fields, data items and datasets almost casually. If I tried to perform an illegal function, for example, adding another field to an automatic master set, I would receive a gentle warning and be returned to the preceeding prompt.

Adager

SYSTEM REQUIREMENTS: MPE IV, MPE V, MPE XL; Series II through 955

PRICE: Model 1: $1,500 for first CPU and $150/year maintenance. Model 2: $6,500 for first CPU and $1,000/year maintenance. Additional copies are 80 percent off both the license fee and maintenance. (Price is not CPU dependent.)

ADAGER

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(208) 726-9100

FOUNDED: 1978

PRODUCT LINE: ADAGER

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The prompts for datasets or data items will accept either the set or item name, an abbreviation for the name, or the set or item number. If you enter an abbreviation that isn't unique, such as EMP when both EMPLOYEE# and EMP-NAME exist, Adager will display the names that match and reprompt you to choose one of the matchees. The ability to create a batch job file to process your Adager changes is well implemented, though I couldn't submit the resulting job file using Vesoft's STREAMX program from a Macintosh running a terminal emulator. (Submitting the job to MPE through SPOOK and Edit/3000 worked without a problem. I believe the problem is an idiosyncracy of STREAMX and/or the terminal emulator, not of Adager.)

Adager can perform several requests in a single pass through your database to reduce both the time necessary to describe the changes and the time (and computer overhead) necessary to perform the changes. Commands that generate lengthly listings are easily (if imperfectly) interrupted using CTRL Y. When interrupting the on-line help for command names I wasn't returned to the previous prompt. Instead, the database was closed and I was bounced back to the database name prompt—a minor inconvenience.

I would expect the new Adager user familiar with IMAGE and its constraints to have little trouble using Adager's functions. When contrasted with the historical alternative (DBUNLOAD, etc.) you will wonder how you ever got along without this product.

Sometimes Ornery

So what's to complain about? Well, for a product that's over 10 years old, Adager can be surprisingly rough around the edges, and sometimes downright ornery.

In attempting to change the capacity of several datasets in a single pass, I mistakenly requested that an expanded set be built on logical device number three when I had intended to request a change in the capacity of dataset number three. Though I immediately realized my error (and Adager's error — our Micro XE doesn't have a logical device number three), I couldn't find a way to "back-up" to the preceeding prompt. Perhaps I could have aborted the program and started again (now where is that Adager manual?), but I thought I would take the easy way out — work my way down to the final "Apply Changes?" prompt and exit.

When I got to "Apply Changes?" I was unpleasantly surprised to find that responses of "?", "HELP", "H" and what have you, fell on deaf ears. (Where did it say "Simply enter a question mark whenever you need help?") A default response of a carriage return would clearly apply the change, so I thought I would do the intuitive thing and respond with "EXIT". (After all, Adager is so simple to use that "You don't need training..." and no manual is provided. More on that later.) I was then very surprised to find that Adager interpreted a response of "EXIT" to mean the same as a carriage return and started to

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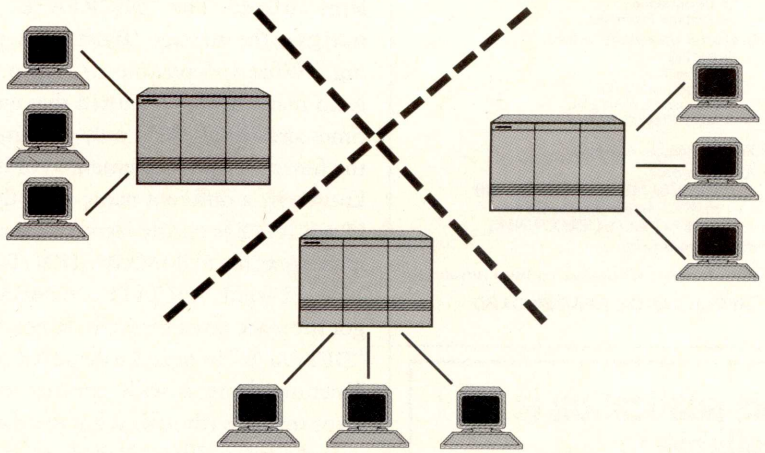

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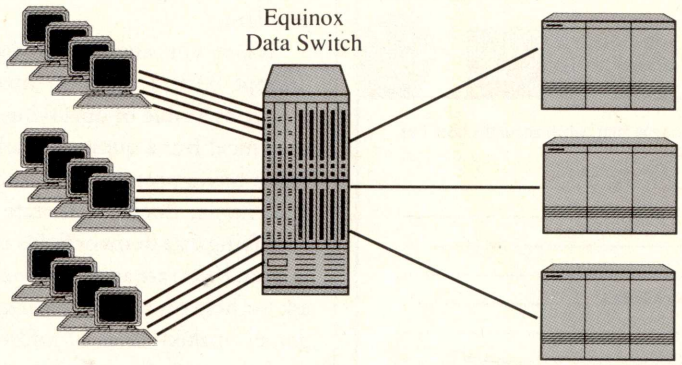

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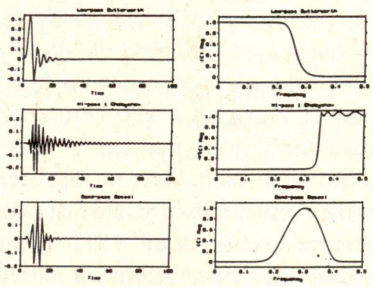

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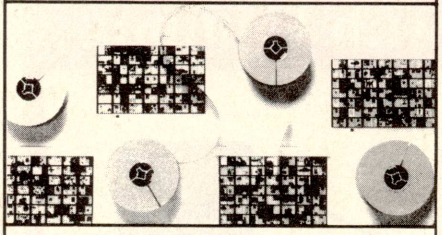

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apply the changes.

When it came time to expand my dataset onto nonexistent logical device number three, Adager returned a cryptic file system error message and left me with a corrupted database. The sequence of problems I encountered (no trapping of the input error, no ability to return to the previous prompt, insufficient help at the "Apply Changes?" prompt, misinterpretation of "EXIT" and failure to trap the input error when starting the database transformation) meant that I would have to review this legendary product more carefully than its reputation suggests.

As I continued my testing, other problems surfaced. The "DBCREATE" function gave the message "BaseCreate, pending." What does that mean? (Again, there is no manual. Have I noted that enough times already?) I could only presume that the function isn't implemented or is now known by a different name even though DBCREATE is clearly listed as a function in the text file SUMMARY.DOC.REGO. When I tried "CREATE DATABASE" I got the same error message. When I tried "DETPACK" to repack a detail dataset the function aborted with another cryptic error message (though it left the database undamaged). When I tried to erase a database with "ERASE DATABASE" I received the error "BaseErase (Cremate), pending." Trying to move a dataset to my nonexistent logical device number three ruined the database in the same manner as my previously described capacity change problem.

When you answer the dataset name prompt with a question mark, Adager generates a table of qualifying datasets — very nice! But a question mark response, when being prompted for a data item or field name, doesn't generate a table of qualifying data items or fields as one might expect. If you are an Adager neophyte and ask for help on capacity management you get all of three lines of information. Included in the three lines is "Master datasets... may take longer (than detail datasets)." On our Series 70 we have master datasets that take over 16 hours for a capacity expansion — somehow "may take longer" doesn't suggest that you should reserve a good part of your weekend if your database is sufficiently large.

This is by no means a criticism of Adager's speed, but of its help facility and documentation. A DBUNLOAD and DBLOAD of our production database might easily take 100 hours if we were ever foolhardy enough to attempt it. But wouldn't it be nice to have some means of estimating the time a change will require before performing the change for the first time?

And why doesn't Adager check how much disc space my expanded dataset will require before it starts the expansion? If you can't make sufficient space available — and to its credit Adager goes to great lengths to assist you with reclaiming space — then you eventually get to the prompt "Do you want to quit, ruining your database?" A question mark in response to the prompt returns only "Please answer Yes or No." If you have no more space to reclaim, you're stuck. Wouldn't it be simplier to check that the space is available before starting the transformation?

As noted earlier, Adager doesn't allow you to rename a database to a group other than the logon group, even if you're the account manager. I don't know why this feature shouldn't be available. I double checked my security matrix and could find no reason at the MPE level to prevent my attempted rename.

Documentation

Adager's "reference manual" is only a single page. It describes installation of the product and the running of the Adager program. It notes that you don't need training to use Adager and lists Adager's address for support and updates. If you have some experience with IMAGE database changes and you don't encounter any problems, then you won't need a manual (or training) to use Adager, as claimed by the marketing literature.

But could Adager use a manual? Definitely. A manual could go far beyond the on-line help facility's brief descriptions and suggestions and could help Adager users better exploit the full power of the program. Any online help facility, even a good one such as Adager's, is limited in

the type of assistance it can provide because on-line help is by its very nature context sensitive. No online help facility can do justice to broad topics that aren't related to specific functions. A further handicap is that the text of the online help isn't available for printing to the line printer, which can make developing a plan of attack prior to the transformation a bit more difficult.

Overall, the help facility is very good, but the quality of help on individual functions ranges from outstanding (even awesome) to insufficient.

Errors And Error Handling

As the problems I noted earlier show, the overall error handling within Adager can leave something to be desired. (Of course if you heed the repeated Adager warning to back-up your database before attempting a transformation you won't have any problem recovering from an error.) As also demonstrated by my problem with logical device number three, Adager doesn't always check to make sure that your database transformation request is legal before starting the transformation. Overall, I would have to rate error handling as only fair.

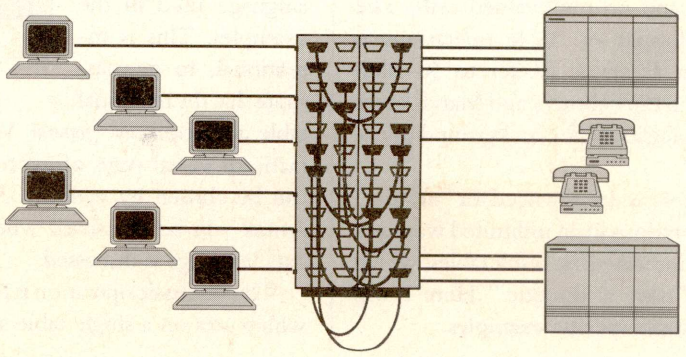
Technical Support & Policies

Adager's support consistently rates high marks from users. The Adager staff knows IMAGE inside and out and knows its product even better. The Adager office is staffed from about 7 a.m. to 6 p.m (Mountain time). After hours you can leave a message and your call will be returned when the messages are checked. Messages are checked from time to time during off-hours.) A call I placed during regular business hours was answered within two rings by a staffer who also was able to answer all of my pricing and product questions. In short, my calls was handled knowledgably, professionally and courteously. Adager's high reputation for technical support is well-deserved. Their support rates a value of excellent.

Adager broke new ground for a third-party product when in 1984 Hewlett-Packard offered supplemental direct support for Adager through the HP Response Centers. To my knowledge, Adager is still the only third-party product to have been bestowed that honor. Response Center support for Adager is free if you have HP's utilities coverage, which is only $40 per month. (Update tapes and product enhancements aren't handled by HP but are handled by Adager directly.)

Adager always has been a good value, especially on the larger CPUs, and remains one still. It can perform nearly any type of structural change to your IMAGE or TurboIMAGE database. It works largely as advertised and the Adager reputation for support is well deserved.

All patched up?



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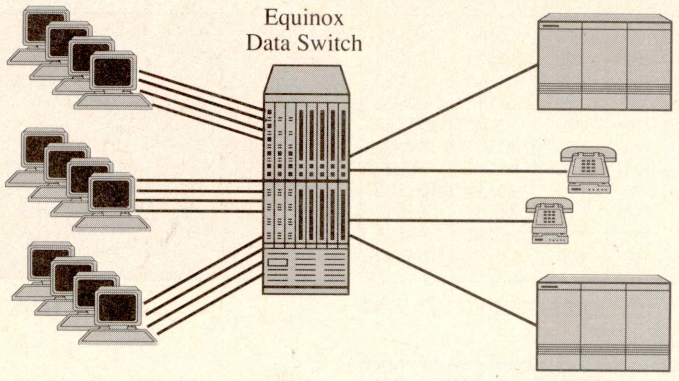

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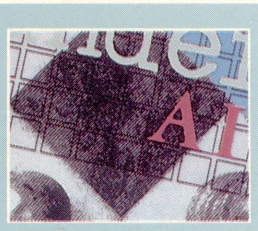

RDBMS

Fabian Pascal

Basic Table Operations

Previously, I provided a conceptual description of the mathematical operations applicable to whole tables, *if* they obey the relational discipline: no duplicate rows, no intrinsic ordering and no multivalued cells. The generic format of table operations is shown in *Figure 1*. (Refer to RDBMS columns in the February and March issues of HP Professional, for background information.)

I also referred to the need for "nesting" these operations in an unlimited way, and to access intermediate result tables, which I called "table arithmetic." Here I will provide some specific examples.

The examples will be drawn, as usual, from the software project management database in *Figure 2*.

Keep in mind that there is no specific data language used in the examples. This is intentional, to demonstrate that the relational table operations are *general*: Various syntactic or visual ways of expressing them can be chosen by vendors. A particular syntax will be presented when the SQL data language is discussed.

The first basic operation is RESTRICT, which acts on a single table and restricts the result to specific rows *(Figure 3A)*.

This operation is applied, for example, to the DEPARTMENTS table to answer the query:

> Find All Information On The 'E' Departments

FIGURE 1

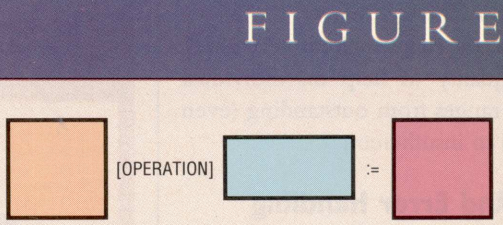

Table Arithmetic

FIGURE 2

PROJ#	ACT#	ASTAFF	ASTART	AEND
MA2112	70	2.00	1/01/82	7/01/82
MA2112	180	1.00	7/01/82	2/01/83
MA2113	60	1.00	2/15/82	9/01/82
AD3112	60	0.75	1/01/82	3/15/82
AD3112	70	0.75	1/01/82	10/15/82
AD3112	80	0.35	8/15/82	12/01/82
AD3112	180	0.50	8/15/82	1/01/83
AD3113	70	1.25	6/01/82	12/15/82
AD3113	80	1.75	1/01/82	4/15/82
AD3113	180	0.75	3/01/82	7/01/82
OP1010	130	4.00	1/01/82	2/01/83

ALLOCATIONS Table

ACT#	ACODE	ANAME
10	MANAGE	Manage/Advise
30	DEFINE	Define Specs
40	LEADPR	Lead Program/Design
60	LOGIC	Describe Logic
70	CODE	Code Programs
80	TEST	Test Programs
130	OPERAT	Oper Computer Sys
140	MAINT	Maint Software Sys
160	ADMDB	Adm Databases
170	ADMDC	Adm Data Comm
180	DOC	Document

ACTIVITIES Table

PROJ#	ACT#	EMP#	ESTART	ETIME
MA2112	180	150	7/15/82	1.00
MA2113	60	160	7/15/82	1.00
OP1010	130	310	1/1/82	1.00
AD3112	70	250	8/15/82	0.25
AD3112	180	250	8/15/82	0.50
AD3112	80	250	10/15/82	0.50
AD3112	60	250	1/1/83	1.00
AD3113	80	260	3/1/82	0.50
AD3113	180	260	4/15/82	1.00
AD3113	70	260	6/15/82	0.50

ASSIGNMENTS Table

DEPT#	DNAME	MGR#	RDEPT
A00	COMPUTER SVCS DIV.	10	
D01	DEV. CENTER		A00
D11	MFG. SYSTEMS	60	D01
D21	ADM. SYSTEMS	70	D01
E01	SUPPORT SVCS	50	A00
E11	OPERATIONS	90	E01
E21	SOFTWARE SUPPORT	100	E01

DEPARTMENTS Table

EMP#	ENAME	DEPT#	HIRED	SALARY
100	Spenser	E21	6/19/80	26150
150	Adamson	D11	2/12/72	25280
160	Pianka	D11	10/11/77	22250
310	Setright	E11	9/12/64	15900
250	Smith	D21	10/30/69	19180
260	Johnson	D21	9/11/75	17250

EMPLOYEES Table

PROJ#	PNAME	ERESP	PSTAFF
MA2110	PROGRAMMING	60	9.00
MA2111	PROGRAM DESIGN	220	2.00
MA2112	ROBOT DESIGN	150	3.00
MA2113	PROD CONT PROGS	160	3.00
OP1010	OPERATION	90	5.00
OP2010	SYSTEMS SUPPORT	100	1.00
AD3112	PERSONNEL PROG	250	1.00
AD3113	ACCOUNT PROG	270	2.00

PROJECTS Table

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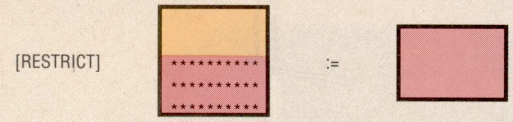
FIGURE 3

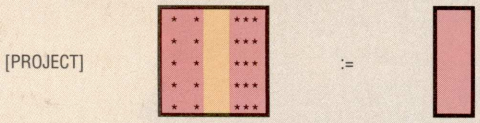


3a: RESTRICT restricts the result to specific rows

DEPT#	DNAME	MGR#	RDEPT
E01	SUPPORT SVCS	50	A00
E11	OPERATIONS	90	E01
E21	SOFTWARE SUPPORT	100	E01

3b: A RESTRICT Example

FIGURE 4

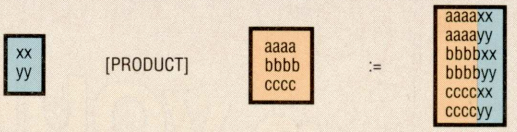


4a: PROJECT restricts results in columns

ENAME	HIRED	SALARY
Spenser	6/19/80	26150
Adamson	2/12/72	25280
Pianka	10/11/77	22250
Setright	9/12/64	15900
Smith	10/30/69	19180
Johnson	9/11/75	17250

4b: A PROJECT Example

FIGURE 5



5a: PRODUCT combines the columns of both tables

PNAME	PSTAFF
PROGRAMMING	9.00
OPERATION	5.00

5b: BIG_PROJECTS - Restrict/Project on PROJECTS

ANAME
Adm Databases
Adm Data Comm

ADM_ACTIVITIES - Restrict/Project on ACTIVITIES

PNAME	PSTAFF	ANAME
PROGRAMMING	9.00	Adm Databases
PROGRAMMING	9.00	Adm Databases
OPERATION	5.00	Adm Data Comm
OPERATION	5.00	Adm Data Comm

5c: BIG_PROJECTS Product ADM_ACTIVITIES

*Figure 3*B shows the result.

The PROJECT operation, which does the same thing but with columns rather than rows, is illustrated in *Figure 4A*.

It's applied, for example, to the EMPLOYEES table to answer the query:

> Find Name, Hiring Date And Salary Of All Employees

with the result displayed in *Figure 4B*.

The result is the projection of the EMPLOYEES table on the ENAME, HIRED and SALARY columns.

The third operation, PRODUCT *(Figure 5A)*, concatenates every row of one table to each row of another, yielding a result that combines the columns of both tables, and has as many rows as the product of the number of rows in each.

But if we applied it, for example, to the whole PROJECTS and ACTIVITIES tables, we would get a result with 3+4=7 rows and 11x8=88 rows. To limit the result to a smaller table, we will operate on smaller tables.

First restrict the PROJECTS table to rows that have staffs equal to or greater than 5.00 (2 rows) and limit it to just two columns, PNAME and PSTAFF. Similarly, restrict ACTIVITIES to administrative activities (2 rows), and a projection of just one column, ANAME. The resulting BIG_PROJECTS and ADM_ACTIVITIES tables, shown in *Figure 5B*, demonstrate how the two table operations can be nested.

Now, PRODUCT is applied to these two reduced tables to answer the query:

> Find Administrative Activities If All Were Allocated To Big Projects

to get the result in *Figure 5C*.

If the query and its result don't make much sense, it's because the PRODUCT operation is seldom used alone. It's needed for combination with other operations such as RESTRICT and PROJECT, in order to obtain yet other critical operations such as JOINS, as we shall see.

The fourth basic operation is UNION. It unifies rows with the same number of columns (which must be of the same data type) from two tables into one table (*Figure 6A*).

Suppose the EMPLOYEES table was split in two: one for employees in San

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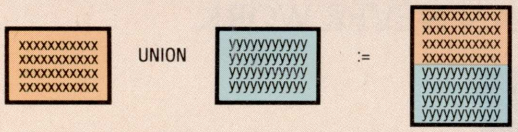
FIGURE 6



6a: UNION unifies rows with same number of columns

EMP#	ENAME	DEPT#	HIRED	SALARY
100	Spenser	E21	6/19/80	26150
150	Adamson	D11	2/12/72	25280
160	Pianka	D11	10/11/77	22250

6b: SF_EMPL Table

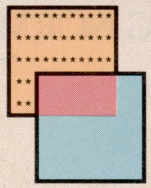
EMP#	ENAME	DEPT#	HIRED	SALARY
310	Setright	E11	9/12/64	15900
250	Smith	D21	10/30/69	19180
260	Johnson	D21	9/11/75	17250

DC_EMPL Table

EMP#	ENAME	DEPT#	HIRED	SALARY
100	Spenser	E21	6/19/80	26150
150	Adamson	D11	2/12/72	25280
160	Pianka	D11	10/11/77	22250
310	Setright	E11	9/12/64	15900
250	Smith	D21	10/30/69	19180
260	Johnson	D21	9/11/75	17250

An UNION Example

FIGURE 7



7a: DIFFERENCE subtracts from one table the part that doesn't exist in the other.

DEPT#	DNAME	MGR#	RDEPT
A00	COMPUTER SVCS DIV.	10	
D01	DEV. CENTER		A00
E01	SUPPORT SVCS	50	A00

7b: A DIFFERENCE Example

Francisco and one for D.C. employees, as shown in *Figure 6B*. It's possible to combine the rows from both tables into one. For example, if we want to produce a unified personnel report, use UNION, *Figure 6B* shows what we would get if, for example, we wanted an answer to the query:

> Find Employee Data On All Employees (in both San Francisco and Washington D.C.).

In fact, we get the original EMPLOYEES table (as in *Figure 2*) as a result. This demonstrates the flexibility and simplicity of reorganizing the data in a relational database. Such flexibility is needed because the business environment changes frequently. For example, the project could start in one city but expand to another, which would require distributing the original data in two tables, each stored locally. *Figure 6B* also reiterates the possibility of nesting multiple operations. We could have easily limited the union result to specific rows (i.e., restrict), columns (i.e., project) or both.

Figure 7A shows the last basic operation, DIFFERENCE. It subtracts from one table rows that don't occur in another table (i.e., it takes from it only the rows not common to both tables), hence its name.

For example, suppose we wanted an answer to the query:

> Find All Information About Departments With No Employees

By "subtracting" from the DEPARTMENTS table the rows in the EMPLOYEES that have DEPT# assignments, we would get the result in *Figure 7B*.

If you look carefully at the EMPLOYEES table, you'll see that employees are assigned only to the departments E21, D11, E11 and E21. The rows identified by these DEPT#s were, therefore, "subtracted" from the DEPARTMENTS table in the DIFFERENCE operation, leaving in the result only the rows representing departments without employees. Again, the result could have been limited further with RESTRICT and PROJECT.

These, together with ASSIGNMENT, (which assigns results of query to a table) are the basic table operations. Several points should be made. First, note that there's no reference in the operations to any internal computer mechanisms. That is, they are purely logical. Second, the operations are on one or two *whole* tables (i.e., they are "set level"), and don't require any record by record looping, as in traditional procedural approaches. Third, each of the operations is used to answer real questions that users need to pose to the database. Thus, the fact that they have a theoretical basis doesn't mean, as some would make you believe, that they don't have practical value. In fact, if they aren't properly supported by the DBMS, you would have to resort to writing programs to generate the answers.—*Fabian Pascal is president of micro-paSQaL, a Washington DC consulting firm specializing in PC relational database management and SQL, and is affiliated with Codd & Date Int'l.*

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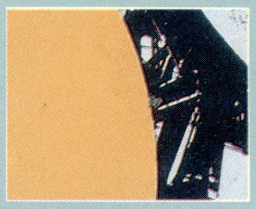

HP-UX

Andy Feibus

Documentation Utilities

HP-UX documentation utilities **nroff** and **tbl** offer several useful options for creating documents. **Nroff** provides a way to control the format of a document and **tbl** provides a way to format tables within these documents. This month's article focuses on several commands associated with **nroff**.

First, to format a file using **nroff**, use the command

```
$ nroff file
```

where file is the input file to format. The output from **nroff** automatically is sent to standard output; to route output from **nroff** to your printer, use the command

```
$ nroff file | lp
```

An input file for **nroff** contains both blocks of text and control commands. Each line of text within a block is terminated by a line-feed. Each block of text is terminated by either a blank line or by a control command. Successive lines of text, regardless of length, are considered part of one paragraph. For example, the following text:

```
This is an input line.
This is a green-colored lime.
A lemon combined with thyme.
```

is formatted as (depending on the current margins):

```
This is an input line. This is a green-
colored lime. A lemon combined
with thyme.
```

Control commands may be included within a line of text (*in-line commands*) or can reside on a line without text (*command lines*). In-line commands are started by the current escape character (defined by the **ec** command line); normally, the escape character is defined as a backslash (\).

Command lines always are started in the first column of a line and are preceded by either a period (.) or a single quote ('). Certain commands within **nroff** cause a break to occur. A break forces any partially completed lines to output. Any control lines beginning with a single quote suppress this action if the control command would have forced a break to occur.

For example, the command to force a page break is **bp**. To force the page break immediately (any partially filled lines are not completed or adjusted), use the command **.bp**, however, to permit the completion of the current line, use the command **'bp**.

To force a break, use the command **.br**. This is useful for single-spaced lists:

```
apple
.br
orange
```

```
.br
banana
.br
```

Produces:

```
apple
orange
banana
```

Without the **.br** commands, the output would appear as **apple orange banana**.

Certain **nroff** commands require a numerical spacing argument. This argument can be either a number or a number with a sign (+ or -). This number can be optionally followed by a scaling factor. For example, to set a page length of 11 inches, you would use the command

```
.pl 11i
```

The scale factor of **i** indicates inches; the scale factor **c** indicates centimeters. To incrementally set a spacing size, preface

TABLE 1

N	Meaning
1	Permit hyphenation according to normal rules. This rule also applies for all N greater than 1.
2	The last word of the last line of a page is not hyphenated.
4	Do not hyphenate the last two letters of any word.
6	Same as the rule for N = 2 and the rule for N = 4.
8	Do not hyphenate the first two letters for any word.
10	Same as the rule for N = 2 and the rule for N = 8.
12	Same as the rule for N = 4 and N = 8.
14	All rules imposed.

Rules to follow while using nroff.

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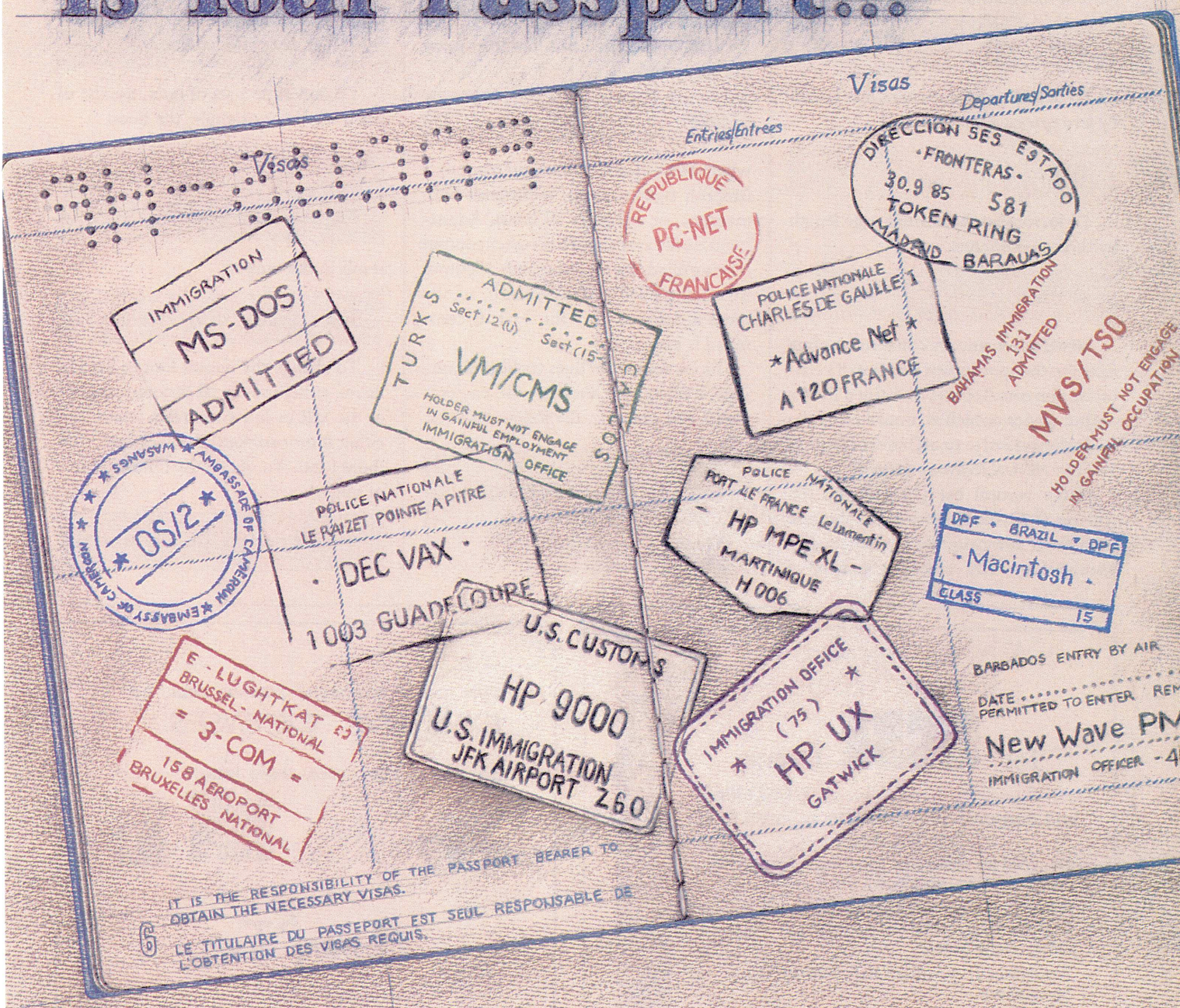

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the number by a + (increment) or - (decrement). For example, to set the current indentation to 10 spaces, use:

```
.in 10
```

To decrement the current line length by five spaces, use

```
.ll-5
```

To increment the current page length by three centimeters, use

```
.pl +3c
```

Nroff automatically converts a scaling factor to the appropriate number of vertical or horizontal spaces as defined by the output device (which is controlled by the options specified to **nroff**; refer to Section 1 of the *HP-UX Reference Manual*).

If the vertical bar (**|**) precedes the spacing, (**| 3i**), the distance to this absolute location is automatically generated. For example, **.sp | 1.5i** causes the next line of output to be placed exactly 1.5-inches from the top of current page, regardless of where on the page the last line of output was placed.

With **nroff**, you can adjust lines using the command:

```
.ad M
```

where **M** is either **l** (smooth left margin), **r** (smooth right margin), **b** (smooth both margins), or **c** (center all lines). Adjustment is only available if the current output is being filled (the **.fi** command). If output isn't being filled (**.nf** command), adjustment is deferred until the next **.fi** command is executed.

To center a set of lines without adjusting (or filling) the lines, use the **ce** command. For example, the following lines:

```
.ce 3
This is the first centered line.
This is the next line.
The last centered line.
```

result in the output:

```
This is the first centered line.
   This is the next line.
   The last centered line.
```

To underline a set of lines, use the **ul** command. For example, the lines:

```
.ul 2
This is a
couple of underlines.
```

result in the output:

This is a couple of underlines.

To change the output font to bold or italics, either use the **.ft X** command line or the **\fX** in-line command, where **X** is either **R** (normal font), **I** (italics font), or **B** (bold font). To obtain the following line of output:

```
This is a perfect line of bold output.
```


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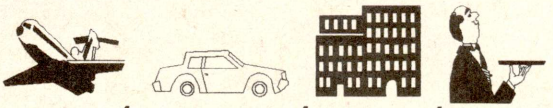

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Use either:

```
This is a
.ft B
perfect
.ft R
line of bold output.
```

or

```
This is a \fBperfect\fR line of bold
 output.
```

With **nroff**, you also can control how words are hyphenated. To turn off all hyphenation, use either the **.nh** command or the **.hy 0** command. To hyphenate words, use the **.hy N** command with **N** greater than 0, according to the rules in *Table 1*.

To include another **nroff** source file in your current source file, use the **.so** command. Once the included file has been read and processed, **nroff** continues processing with the current source file.

Nroff also has certain environmental storage areas, called registers, that contain information pertaining to the current document. For example, the register **%** contains the current page number of the document. Most registers you will use are predefined registers; however, you can also create and assign values to your own registers by using the **.nr** command.

To display a register, preface the register by the escape character. For example, **\%** is used to display the current value stored in the page register. A few (but not all) **nroff** registers that may be included in your document are:

mo	Current month (1-12).
dy	Current day of the month (1-31).
yr	The last two digits of the current year (e.g., 89).
.c	Number of lines read from the current input file.
ln	Output line number.

To include comments (non-outputted information) within your **nroff** file, use the in-line command **\"** before the comment text. For example:

```
This is formatted \" and this is not
```

results in the text: **This is formatted.**

The escape character (the character used to indicate an in-line command) is normally defined as the backslash (\). To change this character, use the **.ec** command (e.g., **.ec #** would cause you to use **#yr** to display the **yr** register). To display the escape character as part of the text output, include the escape character twice. For example, if the escape character is the **#**, use **##** to display a single **#**). —*Andy Feibus is president of Processware Inc., Atlanta, GA.*

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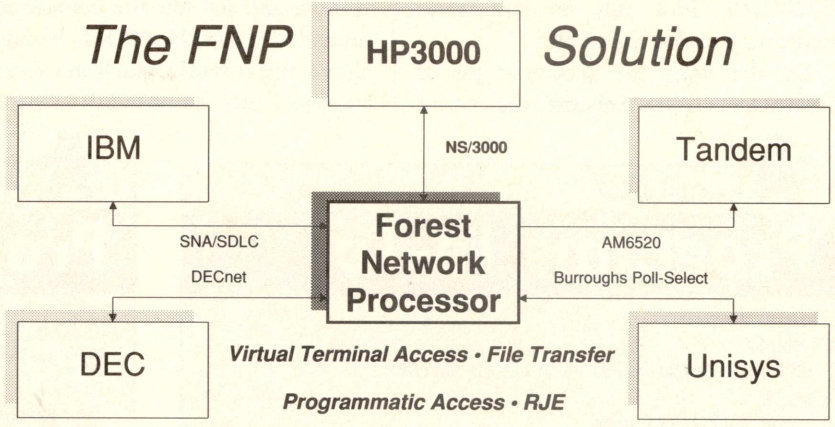

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PC TIPS

Miles B. Kehoe

Batch File Bonuses

*By building modular batch files, and using the **call** command, you will be able to build better applications for yourself and for novice users.*

As you write batch files, often you'll find yourself wanting to use batch files you had already written. Even early versions of MS-DOS allowed you to transfer control from one batch file to another, but it meant invoking an entirely new copy of the command processor.

Consider the batch files called FIRST and SECOND in *Programs 1A* and *1B*.

Of course COMMAND.COM must exist as specified. In those examples, it must reside in the home directory of the C: drive. The /C flag tells MS-DOS to execute the batch file specified (SECOND.BAT) and return to the calling program. Without it, the second COMMAND.COM will load, execute the SECOND.BAT file, and remain without returning to FIRST.BAT. Not only do you waste memory, you don't get back!

By the way, the second copy of COMMAND.COM inherits the entire environment of the first (executing) COMMAND.COM. However, default values are reset. This means that you'll need to set ECHO OFF again.

In Version 3.2, MS-DOS introduced the **call** statement to batch programming. With this **call**, you can invoke other batch files anywhere in your executing batch file, and continue execution at the next line when the **call**ed batch file ends. It looks and acts like the invocation of a second COMMAND.COM as outlined above, but it works much more cleanly. *Program 2* lists the NEWFIRST.BAT that utilizes the **call** command.

The only catch, which in fact was required in FIRST.BAT, is that the file SECOND.BAT exist in the current directory or in the directory specified in the name (i.e. CALL C:\BAT\SECOND.BAT).

By building modular batch files, and using the **call** command, you'll be able to build better applications for yourself and for novice users.

Suppressing Noise

One thing I've never cared for in MS-DOS is that, by default, each batch com-

PCTIPS39.DOC

Programs 1a-1b.

```
echo off
echo Now starting file FIRST. To execute SECOND,
pause
c:\command /c second.bat
echo Now back in the FIRST batch file
```

Program 1a: FIRST.BAT

```
echo off
echo Now running file SECOND. To return to FIRST,
pause
```

Program 1b: SECOND.BAT

PCTIPS39.DOC

Programs 2-3.

```
echo off
echo Now starting file NEWFIRST. To execute SECOND,
pause
call second.bat
echo Now back in the FIRST batch file
```

Program 2: NEWFIRST.BAT

```
@echo off
echo Now starting file NEWFIRST.  To execute SECOND,
pause
call second.bat
echo Now back in the FIRST batch file
```

Program 3: Suppressing echo in NEWFIRST.BAT

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mand is displayed on the screen as it executes. While you can turn off echoing with ECHO OFF as I've done in *Program 1A, B* and *2*, there was no way to suppress the actual ECHO OFF line itself.

With MS-DOS 3.3, Microsoft has introduced a way to prevent any line in a batch file from being displayed. To do so, simply put an "at sign" character (@) at the start of the command line to be suppressed. For example,

```
@echo off
```

causes MS-DOS to perform an ECHO OFF command without displaying it on the screen. Of course, if this line was the first line of any batch file, the user won't see any of the commands displayed. While this doesn't consider the output from the command, I suggest you modify all your batch files accordingly. The NEWFIRST.BAT file from *Program 2* is listed with this slight modification in *Program 3*.

That completes the MS-DOS commands. Next, let's create a program that makes all your batch files more friendly.

Batch Job Control

A little used feature of MS-DOS is the ability any program has to return a numeric value to COMMAND.COM as it exists. Very few programs actually use this feature, but it can be very nice to have. Those of you who work with MPE and HP-UX know just how valuable return codes can be in controlling batch file execution.

First, let's look at a program that will return different codes. This program, when started from a batch file, will accept a single character from the keyboard and return the ASCII code of the character entered. For example, if the user typed the letter **y** for yes, the return code will be decimal 121, the numeric equivalent of ASCII **y**.

The program is provided in *Program 4* for those of you who are comfortable in assembly language. I'll provide an easier way to enter the program in a moment.

PCTIPS39.DOC

Program 4.

```
@echo off
echo Enter any character. I will report y or n only.
echo Press x to quit.
:loop
getch
if errorlevel 110 if not errorlevel 111 echo You typed a 'n'
if errorlevel 121 if not errorlevel 122 echo You typed a 'y'
if errorlevel 120 if not errorlevel 121 goto end
goto loop
:end
```

YESNO.BAT

PCTIPS39.DOC

Program 5.

```
@echo off
cls
echo Loading MS-DOS 3.3 from Drive C:
path c:\bat;c:\bin;c:\nfs;c:\dos;
prompt $p$g
echo Do you want to load Sidekick now?
:loop
getch
if errorlevel 121 if not errorlevel 122 goto loadit
if errorlevel 110 if not errorlevel 111 goto nothanks
goto loop
:loadit
sk
echo Sidekick has been loaded
goto end
:nothanks
echo Sidekick has not been loaded
:end
echo System booted!
```

Sample AUTOEXEC.BAT

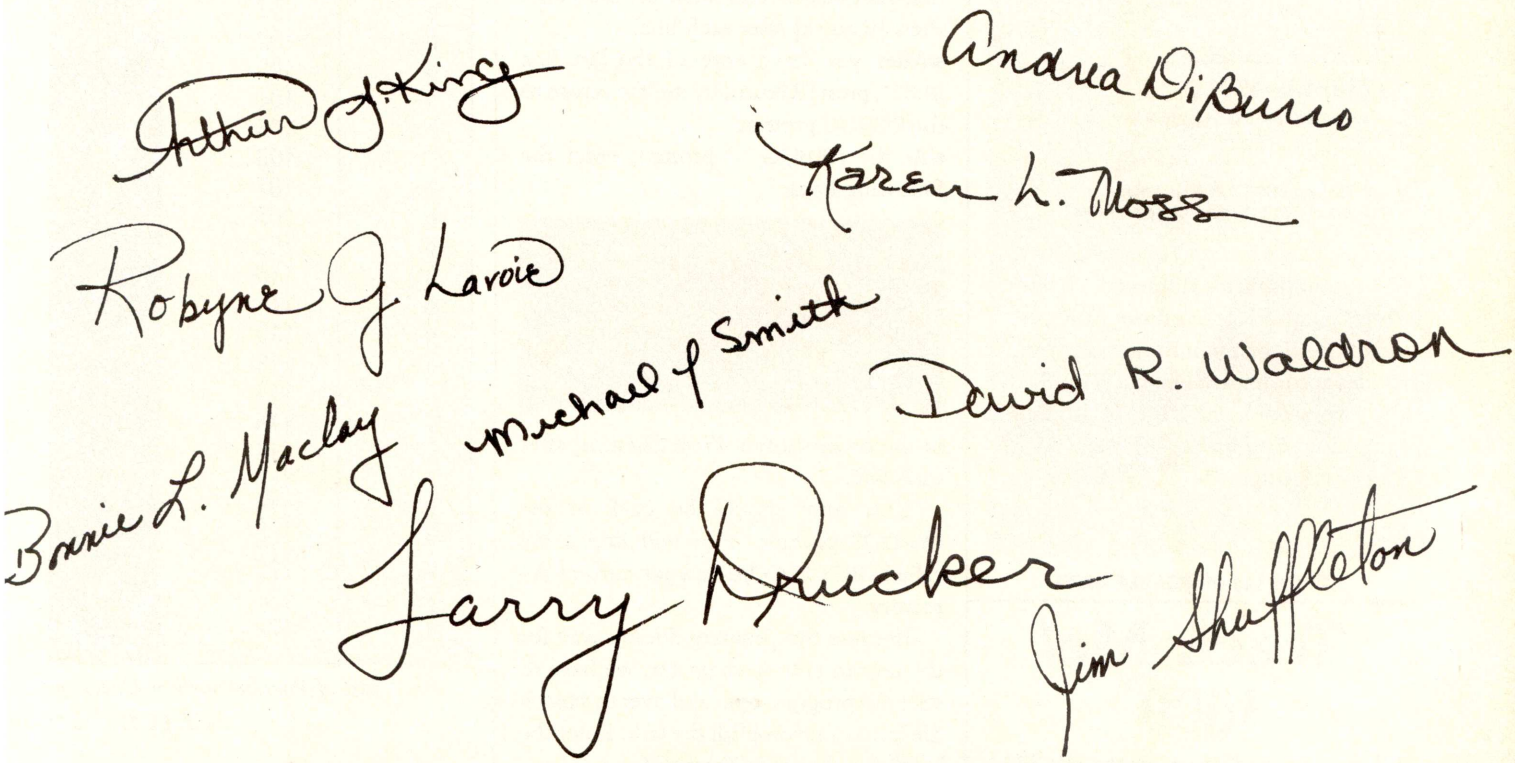
PCTIPS39.DOC

Program 6.

```
MOV     AX, 0600    ; direct console input
MOV     DL,FF       ; Select direct input
INT     21          ; Get the character
JZ`     010F        ; Exit if no character pending
OR      AL, 20      ; Make sure the character is lower case
MOV     AH, 4C      ; Prepare to return the code in AL
INT     21          ; Return it
RET                 ; Return to DOS
```

Program GETCH.COM Source Listing

"WE'RE THERE WHEN YOU CALL."



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For those of you who don't wish to program in assembler, but who do have the DEBUG program, you can enter *Program 4* exactly as shown by following these steps:

- Start DEBUG.
- Type A100 to start accepting Assembly Language input at address 100 hex.
- Type *Program 4* but omit the comments that start at the semicolon on each line. Press [Return] after each line.
- After you have entered the last line (RET), press [Return] by itself to return to the DEBUG prompt.
- At the DEBUG '-' prompt, enter the following lines:

```
RCX
10
N GETCH.COM
W
Q
```

in the order shown. Press [Return] after each line.

You now should be back at the MS-DOS prompt. You will find a file called GETCH.COM in your current directory.

Because this program doesn't wait for the user to enter a character, we have to start this program over and over in a batch file loop to accomplish the task. Enter the batch file shown in *Program 5*.

You can see that YESNO.BAT is something you can use to determine what character the user typed at the prompt. The GETCH program by itself, when used in conjunction with batch files, is something you can use right away.

By the way, if the user enters anything other than a **y**, **n** or **x**, the YESNO program will continue to loop. *Table 1* lists the values that may be returned by GETCH.

Putting It To Use

You might want to see an application where you can use GETCH.COM to your advantage. Suppose you want to have an opportunity to load Sidekick or other pop-up utilities when you start your system in the morning, but you won't always want them loaded.

I've listed what you might have as your AUTOEXEC.BAT file to accomplish this purpose in *Program 6*.

In the coming months I will continue to build on these techniques so that you can create more powerful batch programs for yourself and for end users you may be supporting in your organization. If you have a problem you'd like me to address, please feel free to ask. You can reach me through *HP Professional*, or its ARIS/BB.

— Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.

TABLE 1

Letter	Returns
a	97
b	98
c	99
d	100
e	101
f	102
g	103
h	104
i	105
j	106
k	107
l	108
m	109
n	110
o	111
p	112
q	113
r	114
s	115
t	116
u	117
v	118
w	119
x	120
y	121
z	122

List of Possible Return Codes for GETCH.COM

Would you like to continue to see articles on this topic?
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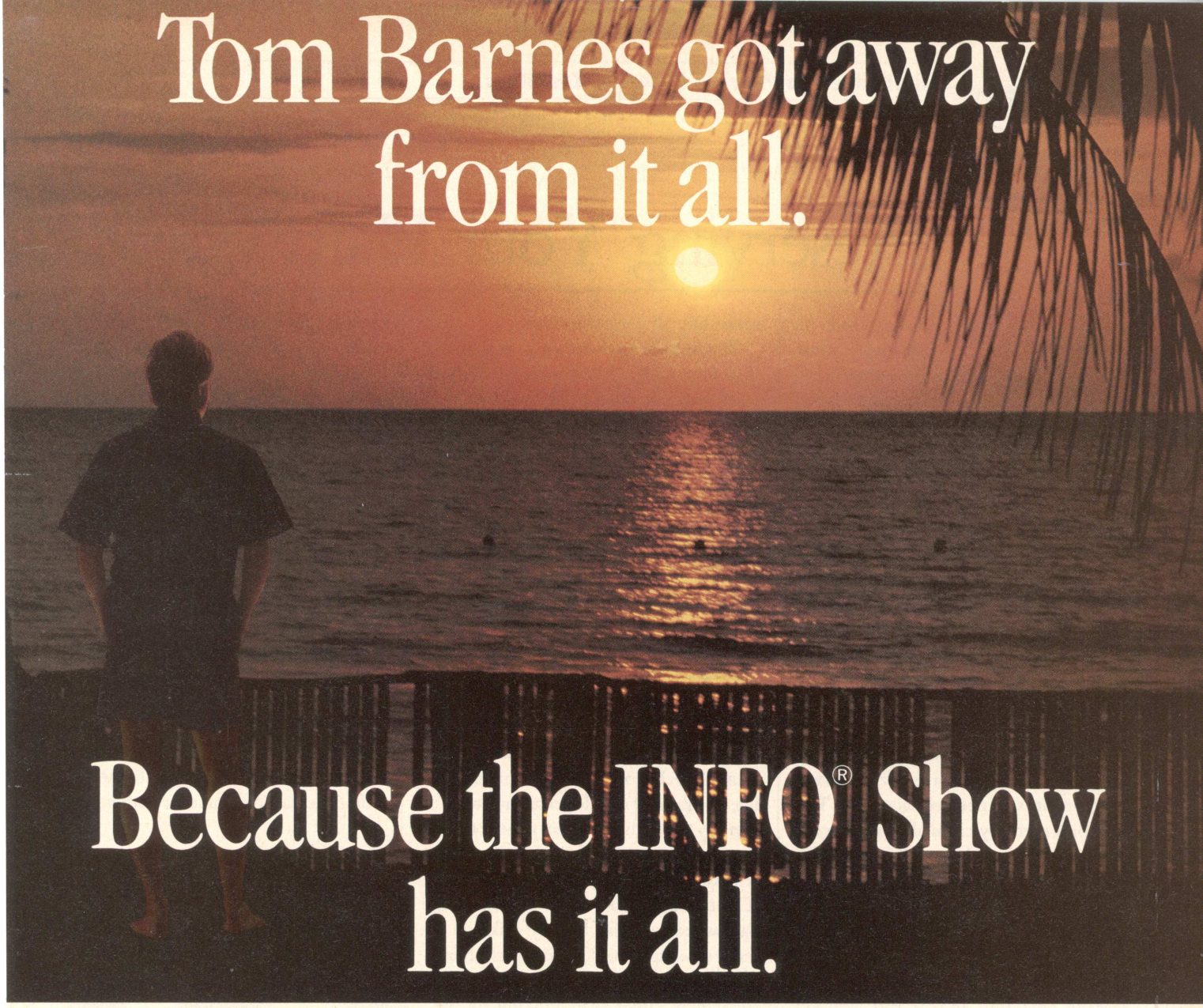

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Ron Levine

Preserving Your Hardware

Take heed: A desktop must be protected. Keeping your hardware (terminal, workstation, or PC) safe from accidental damage or premature wear prevents costly repair and grief.

Climate

Maintaining a controlled environment should be your first concern. The system shouldn't operate in temperatures lower than 5C (41F) or higher than 40C (104F), or humidity outside the five to 90 percent range. An environment exceeding these limits can cause excessive damage and corrosion to system circuitry.

The higher the temperature of the equipment, the sooner your electrical components will need replacement. The desktop's memory chips also are affected by heat. Because the system itself produces heat, it's best to keep the room cool. When setting up your system, choose a spot that will keep sunlight from shining directly on the equipment.

Moisture in any form can permanently degrade operation and/or rust exposed components. To play it safe, it's wise to keep the windows closed on damp days.

Keep objects away from components because air vents must be kept free from obstructions to prevent overheating. Check each piece of equipment to locate the air vents (they aren't necessarily on the top or back). In only a few minutes, a book blocking an air vent can cause erratic system behavior. Position equipment so that there's adequate space between air vents, surrounding walls, furniture or other equipment. Vents also can be blocked by dust or small paper scraps from the printer. Check once a month to make sure all vents are clean.

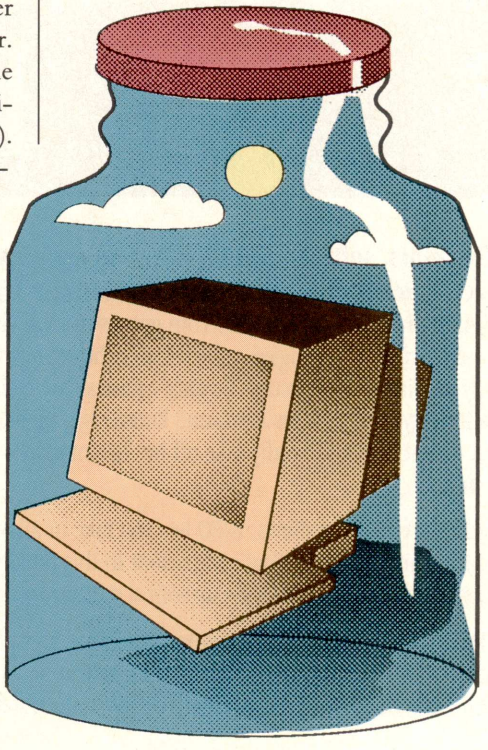
If you have a printer on your desktop, treat it carefully. It has more mechanical parts than any other component of your system and must be treated with extra care. Though it's best not to leave the printer running unless you are in the room, you can start it up and let it run if you come back to check it often and follow these simple precautions.

When you start printing, watch for paper jams (if the problem is because of wrong settings or paper misalignment, it should jam within the first few pages). Make sure the printing isn't crooked ; this is a sign of paper misalignment and will not only cause the printer to jam up, but if left unattended for a period of time, can cause a fire. Be extra careful if you're printing on labels or envelopes as they tend to jam up more often than paper. Check your printer manual to see if the printer will stop automatically when out of paper. If not, the platen can be ruined as the daisywheel or print head(s) strikes it directly (the paper usually cushions the blow).

Always use your paper advance button/wheel rather than yanking on the paper. Tugging, or ripping the pape at an unperforated spot, can pull the mechanism out of adjustment. Once this happens, paper jams become a constant problem that can't be fixed by readjusting the paper. At this point, a repair person is needed to handle the job.

Always use the ribbon and paper types recommended for your model printer. If given a choice, you may find it helpful to know that multistrike ribbons give sharper impressions than fabric ribbons (but fabric ribbons are cheaper). The mechanisms in the printer are particularly sensitive and can be damaged by even the oil in your skin. When changing the ribbon or paper, or cleaning the printer, be sure to follow the manufacturer's directions and don't touch anything inside the printer unless instructed to do so.

When rearranging your office furniture, try to put the printer on a table or desk of its own. The printer vibration has a detrimental affect on every other piece



Protect your hardware from unnecessary wear and tear. A safe environment is a productive environment.

of equipment, over time. Just this one little planning step can save a lot of headaches and money!

In fact, when choosing a computer stand, those that hold every piece of hardware look nice and compact, but may not be worth the price in the long run. Keep in mind that the entire stand tends to vibrate as the printer runs. When selecting a stand, shake it, push on it, give it a good test. A sturdy piece of furniture will be well worth the savings in downtime and repair.

Miscellaneous Do's And Don'ts

Cigarettes, ashtrays, food, paper clips and other items can fall or spill near, in, on, under the computer. They should be kept away from the work area. It's a good idea to keep a dust cover over the equipment whenever it isn't in use. DCs used in manufacturing environments may be particularly subject to sanding particles in the air.

Always turn on all peripheral devices (CRT, printer, etc.) before switching on the DC. When shutting the system down, first switch off the DC before powering down the other units. Never shut off a unit while processing. Wait for the entire system to complete all current operations before turning power (on any of the units) off. For example, if the desktop PC is the only unit actually working at a certain time, it's still not safe to turn off the printer (though the printer may not be printing).

Never force a diskette into a drive by excessive pressure or by using the access door to shove the disc into the drive. If, during insertion into the drive, the disc starts to bend a little, there is a problem. Pull the disc out and try again. Never attempt to insert or remove a disc while the drive's busy light is on. This can damage the drive mechanism as well as the disc.

When not in use, the access doors on the front of the disc drives should be left open (unlatched) to release tension on the door springs.

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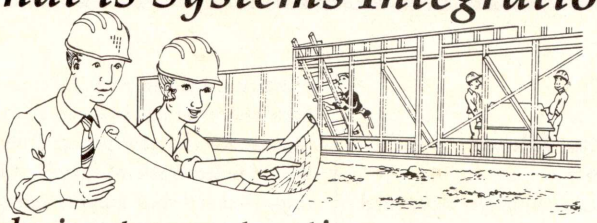
What is Systems Integration?



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Continued from page 26.

FAXCOM/Publisher Allows FAX Transmission

Biscom Inc. announced a computer-automated fax delivery system that works with the PostScript DTP language. FAXCOM/Publisher gives computer systems an automatic fax transmission capability.

Unlike a PC fax board, FAXCOM/Publisher is a multiuser PostScript-compatible facsimile controller designed to work with a variety of microcomputer systems. Interfaced to the host CPU via an RS-232C port, it enables a user to transmit PostScript files directly from any terminal on the system to any Group III fax machine worldwide. The usual steps of printing out hard copy and sending it by mail or feeding it into a regular fax machine are eliminated.

The system is based on 80386 technology, with a coprocessor for graphics processing. It uses 4 MB of internal memory and features mass storage for expanded document capacity.
Contact Biscom Inc., 85 Rangeway Rd., Billerica, MA 01821; (508) 670-5521.

Circle 384 on reader card

ZPay Payroll Releases Envelope Printer

ZPay Payroll Systems announced a new release of GRAB Plus version 5.4 , a memory resident envelope printer. New features include: multiple data files supported in the database; PostScript printer support; HP DeskJet now a selection like the LaserJet printers; Canadian providence as well as U.S. State abbreviations in database look-up table; support for the new power envelope feed of the Hewlett-Packard LaserJet IID printer; improved soft font support and more.
Contact ZPAY Payroll Systems, 3516 Ruby St., Franklin Park, IL 60131; (312) 671-3364.

Circle 398 on reader card

Wollongong Announces WIN/WATCH

The Wollongong Group Inc. introduced WIN/WATCH, a PC-based network monitoring and software debugging tool that simplifies network troubleshooting.

As a network monitor, WIN/WATCH shows the information present in LAN transmissions, enabling the proper diagnoses of performance degradation incompatibilities and routing problems. WIN/WATCH displays in real time; each packet transmitted over an Ethernet LAN. The information displayed is buffered and scrolled on the PC monitor continuously or in single step. WIN/WATCH can buffer up to 32K of network traffic and monitor traffic at high data rates.
Contact The Wollongong Group Inc., 1129 San Antonio Rd., Palo Alto, CA 94303; (415) 962-7200.

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Los Altos Software's ASAP/3000 Licensed By Comshare

Los Altos Software announced that its Batch Report Writer, ASAP/3000, has been licensed by Comshare Inc. for distribution to its PROFILES/3000 customers.
PROFILES/3000 is a human resources recordkeeping system that provides online access to an interactive personnel database. ASAP/3000 is an end-user tool for creating, modifying and running IMAGE database batch reports. All ASAP/3000 reports execute in COBOL-II and COBOL source code is available, on request, for any ASAP/3000 report.
Contact Los Altos Software, P.O. Box 639, Los Altos, CA 94023; (415) 941-6030.

Circle 400 on reader card

Integrates Software through Pictures With HP SoftBench

Interactive Development Environments Inc. (IDE) announced an expanded relationship with Hewlett-Packard by integrating its Software through Pictures CASE tool family with the new HP SoftBench software development environment.

Software through Pictures is a full lifecycle CASE product. It features a graphically-oriented set of tools that runs on X Window System windowing environment on HP 9000 Series 300 workstations.

HP SoftBench is a software development environment consisting of an integrated set of program-development tools and a tool integration platform. Integration of Software through Pictures with HP SoftBench will allow direct access to HP FrameMaker, as technical publishing system.
Contact Interactive Development Environments, 595 Market St., 12th Fl., San Francisco, CA 94105; (415) 543-0900.

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CMS Introduces Modular Adapters For HP 3000

Cable Management Systems Inc. introduced a line of Modular Adapters specifically designed for the Hewlett-Packard Advanced Terminal Processors (ATP).

The Modular Adapter converts the ATP RS232, three pin male connector (HP P/N 92224A) to WEco standard RJ11/12 jacks and the ATP RS422, five pin male connector (HP P/N 92224A) to WEco standard RJ12/45.

HP uses the ATP three and five connectors to support Data Communication in its Series 3000 computer systems.
Contact Cable Management Systems Inc., 3100 W. Warner Ave., Suite 11, Santa Ana, CA 92704; (714) 662-0664.

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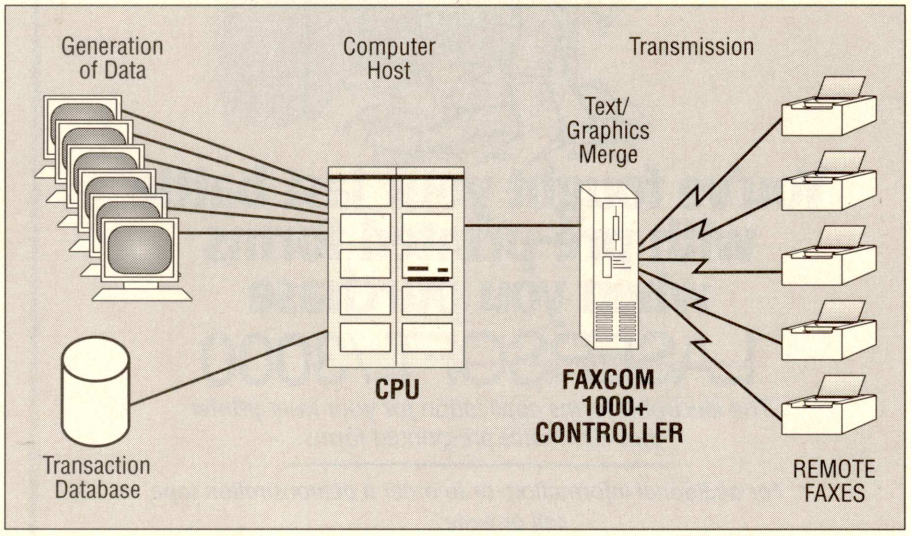
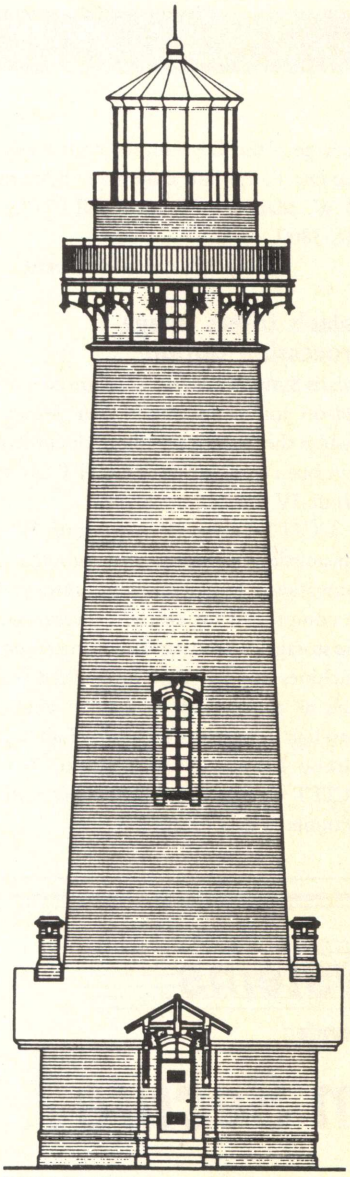


Biscom's automated fax delivery system.



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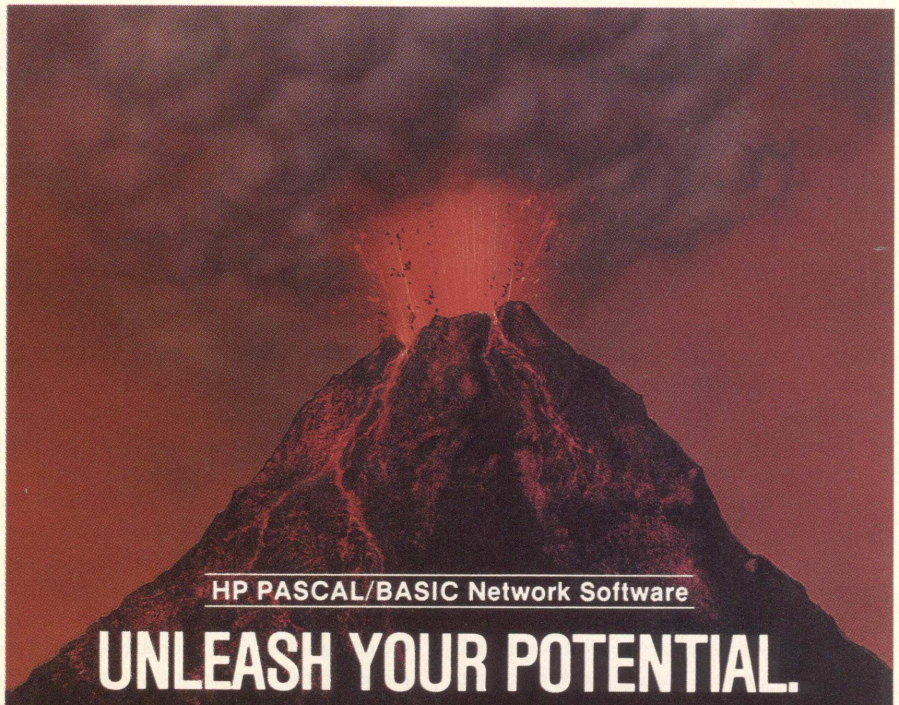

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SMDS Announces Release 7.0 Of Aide-De-Camp

Software Maintenance and Development Systems announced the availability of Release 7.0 of the Aide-De-Camp software management system.

The ADC system provides configuration management and full lifecycle support for software development. The ADC software is available on a range of vendor systems of any CASE tool.

Support for managing binary and any other non-ASCII files is a new feature with the V7 release.

The new V7 ADC system offers enhanced support for parallel development paths, integrated problem report management, automated build procedures and software structural scanning. Improved management reporting facilities enable better software project tracking. Relationship and dependency analysis provide useful information for developers during maintenance and enhancement efforts. Increased access control facilities provide optional levels of security for software data.

Contact Software Maintenance and Development Systems, P.O. Box 555, Concord, MA 01742; (508) 369-7398.

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CCS Releases C++ For HP-PA Series 300

Corporate Computer Systems has released a second C++ translator, this one for the HP-PA Series 300 machine operating under HP-UX. This product joins its current C++ product that runs on the HP-PA Series 800 computer. Both products are a licensed port of the standard C++1.2 AT&T translator especially modified to operate under HP-UX.

C++ is a compatible superset of the standard C language offering additional features to enable more sophisticated error-free programming. Designed as a pre-pass to HP-UX C compiler, C++ is integrated into the UNIX system environment found on the 300 Series computers. It produces standard relocatable modules and interfaces into the XDB debugging package at the C++ source code level.

Contact Corporate Computer Systems Inc., 33 W. Main St., Holmdel, NJ 07733; (201) 946-3800.

Circle 385 on reader card

Talaris Offers Image Processing Option

Talaris Systems Inc. has announced a optional add-on for its multiuser laser printers that enables the direct printing of documents that have been compressed in CCITT Group II or Group IV format.

CCITT Group III and Group IV are fax transmission standards that provide a data compression format allowing scanned data to be compressed for efficient transmission and also storage. It's the standard format used by fax machines and by some high-speed scanners, such as those used to digitize engineering drawings. Compression ratios of up to 20 to 1 (Group III) and 30 to 1 (Group IV) make CCITT encoded files help those with large amounts of data to store.

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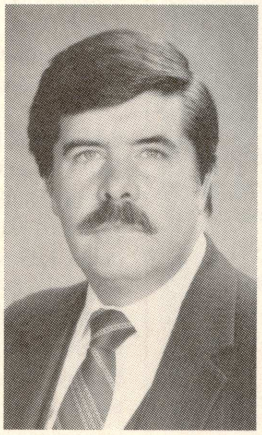

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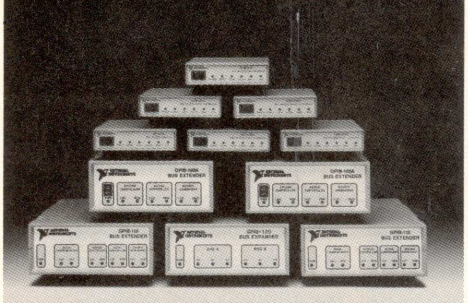
IEEE-488...



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Circle 386 on reader card

BACKUP/CM Available For HP's MPE XL

ORBiT Software USA (Danville, CA) has announced the release of its compatibility mode backup product for HP's MPE XL machines, BACKUP/CM.

BACKUP/CM offers advanced features for the backup process including unattended backup through the use of large disc file-buffers, true disc-to-disc backup for both unattended operation and for a faster store and restore operation, data compression for reduced tape usage, and advanced error detection techniques for improved data integrity and protection. Initial customer feedback reports backup times reduced 30-50 percent with tape usage reduced as much as 60 percent.

Contact ORBiT Software Inc., 319 Diablo Rd., Suite 218, Danville, CA 94526; (415) 837-4143.

Circle 379 on reader card

X.desktop Provides UNIX System Interface

UniPress Software Inc., a UNIX system software developer and distributor, announced the availability of X.desktop, which runs under the X Window system and provides a mouse-driven, icon-based interface to UNIX system files and applications.

X.desktop is particularly valuable to businesses that are adding workstations because it enables new UNIX system users to take advantage of all UNIX system capabilities.

X.desktop runs on most X-Windows-based UNIX computers, making it ideal for system integrators, software developers and OEMs to bundle in with hardware and software packages. Contact UniPress Software, 2025 Lincoln Hwy., Edison, NJ 08817; (201) 985-8000.

Circle 399 on reader card

HP Introduces Modular Spectrum Analyzers

Hewlett-Packard introduced the HP 70004A mainframe and color display, and the HP 70900B local-oscillator (LO) module, which forms the foundation of the new HP 71000C series of modular spectrum analyzers.

HP also introduced four analyzers in the HP 70000 modular measurement system: the HP 71100C RF spectrum analyzer, the HP 71200C microwave spectrum analyzer, the HP 71210C high-sensitivity microwave spectrum analyzer and the HP 71400C lightwave-signal analyzer.

The HP 71000C series spectrum analyzers are based on HP's measurement systems architecture, which offers high-performance, high-frequency measurement capability.

They are useful for applications that require high-throughput measurement capabilities. RF and microwave communications, and automated-test-equipment (ATE) applications in radar-test, surveillance, R&D bench and manufacturing also will benefit.

Arkwright Introduces Thermal Transfer Film

Arkwright Inc. has introduced a clear overhead transparency (OHT) film for use in thermal transfer printers. This smear-resistant transparency film offers bright colors and high-image resolution and line-edge definition.

The Thermal Transfer Film allows PC users to transform computer-generated graphics and text into overhead projection transparencies. The receptive surface of the film readily accepts thermal transfer "wax ink" and provides high resolution of the full spectrum of colors, well-defined color separation and fine-edge definition.

Packaged in boxes of 50 sheets, the film is available from audio visual and office supply dealers, stationers and other retailers at suggested retail prices from $41.25 to $52.50.

For more information, contact Arkwright Inc., Dept P., 538 Main St., Fiskerville, RI 02823-0139; (800) 942- 5900.

Circle 375 on reader card

NAI Adds Laser IID-T To Printer Line

North Atlantic Industries Inc. has added the Laser IID-T to its line of TEMPEST Laser Printers. Now, Hewlett-Packard compatible printers available from North Atlantic include the Laser IIT (single-sided printing) and the Laser IID-T (two-sided printing).

Both the NAI Laser IIT and IID-T meet NACSIM 5100A specifications and function with all HP compatible software, font cartridges and soft fonts without sacrificing throughput speed or print density. North Atlantic Laser Printers also are available with optional Sharespool Cards and Cables to

permit access to a printer by up to four terminals located as far away as 100 feet. An optional envelope feed is also available for the Laser IID-T allowing it to function as a full print station providing sequential printing of first page, second page and envelopes.
Contact North Atlantic Industries, 60 Plant Ave., Hauppauge, NY 11788; (516) 471-2244.

Circle 374 on reader card

REDUCE System Planned For HP-UX 6.5

Innovus Inc. has announced plans to migrate the 3.3 Version of the Reduce Algebraic Programming System to the HP 9000 Series 300 workstations running under HP-UX 6.5. This new release will be available this month and will support HP Common Lisp Version 2.0 and X Windows Version 11 as well as an integrated editor facility.

Unique to the HP-UX Version of REDUCE is a 2D and 3D graphics display capability. The REDUCE environment offers the users a wide range of facilities including differentiation, integration, polynomial and integer factoring, matrix calculations and solutions of linear equations.
Contact Innovus Inc., 200 James St. South, Suite 204, Hamilton, Ontario, Canada, L8P 3A9; (416) 529-8117.

Circle 370 on reader card

Proactive's DB-LITE Available For HP 3000

Proactive Systems has announced DB-LITE, a software product for HP 3000 users that compresses databases and files but allows them to be accessed after compression.

For example you can compress IMAGE databases to as little as 10 percent of their previous size and still read them with normal enquiry and reporting programs. A typical application of the software is archiving of databases for later online access with little cost in disc space.

DB-LITE can compress any type of HP 3000 file including IMAGE database, KSAM/MPE files, source code, etc. It uses an optimal combination of proprietary and public domain data compression techniques to recode data into compact binary strings. After compression, the file scan still be accessed by existing applications programs without program changes being required.

DB-LITE is priced from $1,500 and $4,500

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depending on HP 3000 model.
Contact Proactive Systems, 339 S. San Antonio, Los Altos, CA 94022; (415)941-9316.

Circle 367 on reader card

Telemar Offers Modular Pricing For Telephone System

At the 1989 INTEREX HP Users Conference, Telemar Inc. announced modular pricing for the TeleMarshal Telephone Management System.

For companies who want to control and allocate their telephone expenses and aren't ready to purchase a full telephone management system, or would prefer doing some of the development themselves, Telemar offers a means of coming on stream quickly and inexpensively. Analysis of telephone call records from the PBX, storing the data in an HP 3000 Image database, call pricing, called city/country identification and other functions can be accomplished with Telemar's software.

Telemar provides a 60-day trial for $200 involving the Telemarshal Telephone Management system for which a perpetual license can be purchased for an additional $4,700.
Contact Telemar, Inc., 559 Kensico, P.O. Box 27 Suffern, NY 10901; (914) 357-5240.

Circle 366 on reader card

FOR YOUR INFORMATION

■ SAS Institute now offers consulting services through its headquarters in Cary, NC and a subsidiary near Washington, DC. The services allow users to directly tap the resources and experience of the Institute to meet processing needs. Services include, systems analysis, design and development, prototype development and demonstration systems, statistical design and analysis and more.

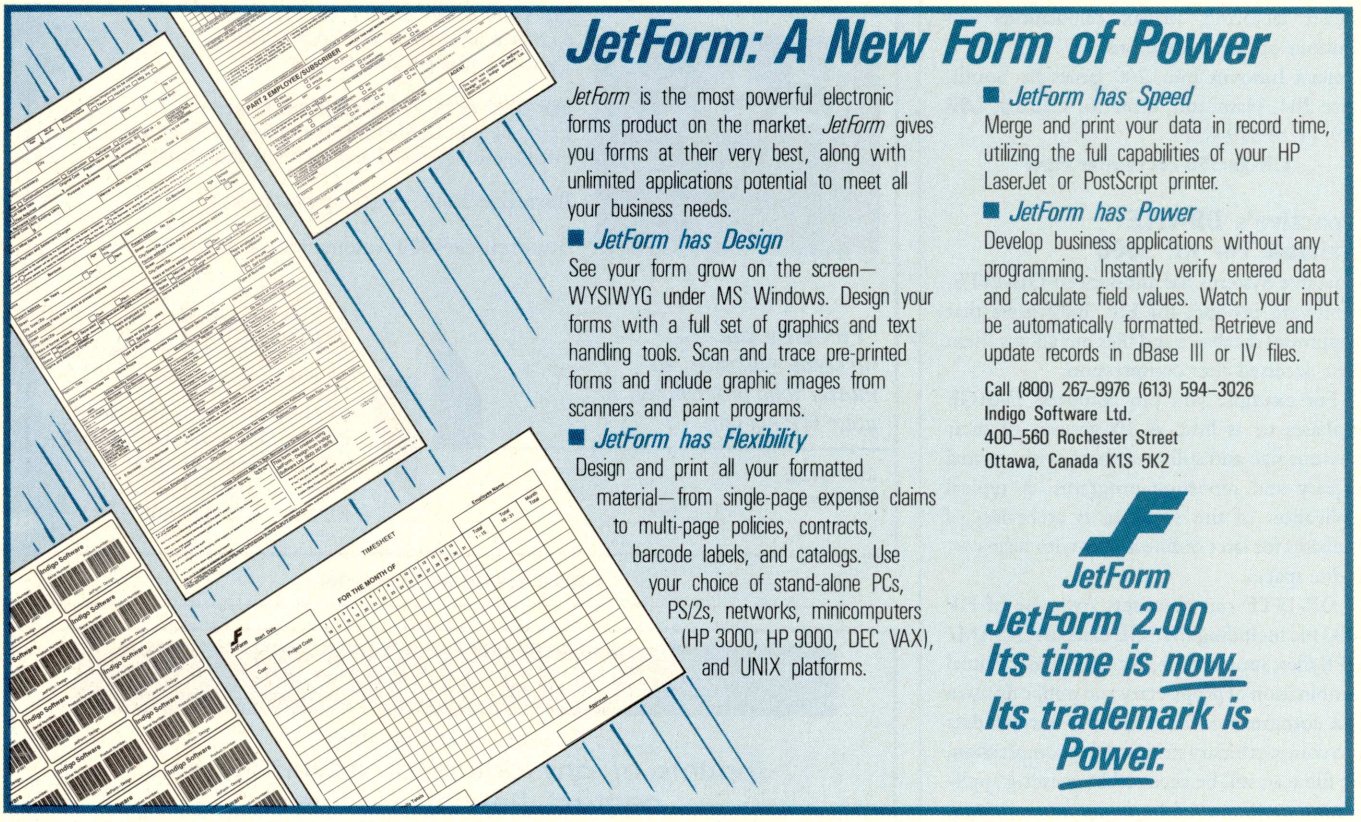
■ Auerbach Publishers, a Division of Warren, Gorham & Lamont Inc. announced the release of Information Management: Strategy, Systems and Technologies, an update service offering MIS managers continuous guidance in all MIS areas.

■ Proactive Systems announces the opening of a new corporate U.S. office. the new office is located in Los Altos, CA.

■ The Cobb Group announces its latest book *LaserJet Companion*, a guide to HP's LaserJet printer family that includes exclusive coverage of HP's newest printer the HP LaserJet IID.

■ Lucid Inc. (Menlo Park, CA) is offering courses covering the range of topics from Introductory Common Lisp to Programming in CLOS. Courses available include: (1) Introduction to Common Lisp, (2) Advanced Features of Lucid Common Lisp Release 3.0 and (3) Programming in CLOS (Common Lisp Object System), both introductory and advanced. Classes are held on a regular scheduled basis at Lucid. They can also be held at a customer's site by request.

■ Fulcrum Technologies Inc. (Ottawa, Canada) recently published the first *Third-party software and Services Catalog* for Fulcrum's Ful/Text indexing and retrieval software. The catalog includes more than 20 software products and services that utilize Ful/Text software and provide solutions to a wide range of applications and support platforms.



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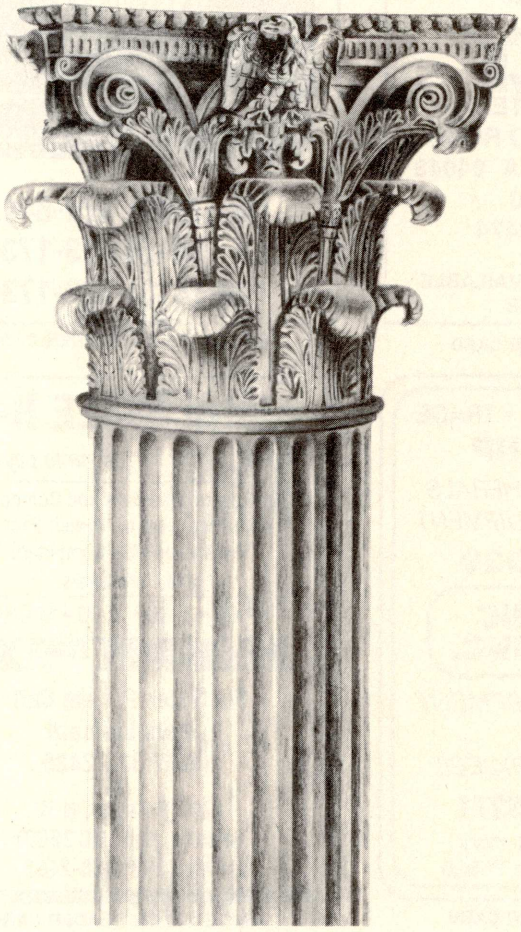

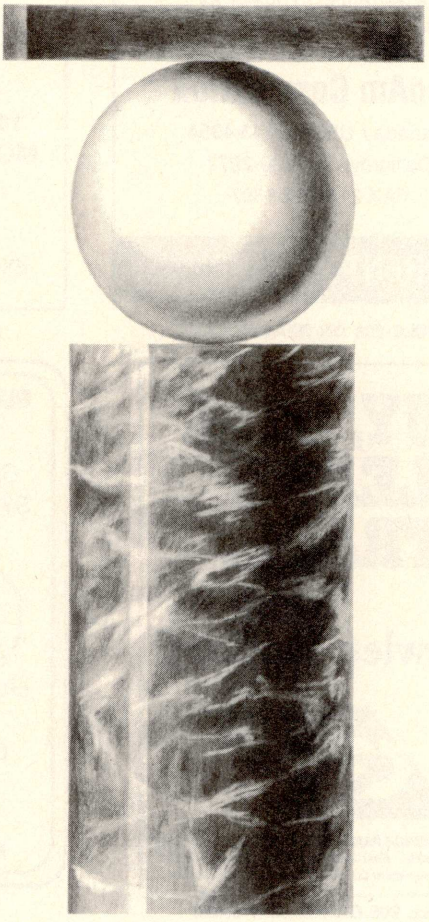

Whatever your taste in architecture, ORBiT Software has an innovative backup strategy to protect data integrity and enhance productivity. Call (800) 666-5463 for a free trial or more information regarding online, unattended and disc-to-disc backup.

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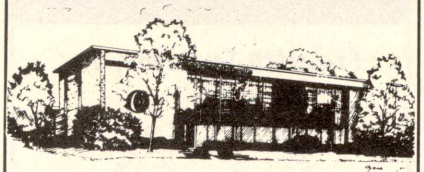

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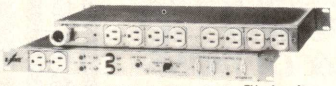

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[CALENDAR]

[SEPTEMBER]

20-22: Expert Systems 89, the ninth annual technical conference of the British Computer Society Specialist Group on Expert Systems is being held in London at the Cumberland Hotel. For more information contact Fiona Pearson, ES89 Secretariat, Clearway Int'l., 9 Pavilion Parade, Brighton, England BN2 1RA; 0273 694079/697149.

21: NECRUG is holding its September quarterly meeting at Stouffer Valley Forge Hotel in King of Prussia, PA. Contact Scott Kauftheil, c/o RSK Consulting Inc., 10 Valley Stream Pkwy., Malvern, PA 19355; (215) 251-0736.

21: Baltimore-Washington TUG quarterly meeting. For information, call Doug Hawkland, (301) 993-5881.

25-27; 10/30 - 11/1: The Relational Institute is sponsoring a course for PC users, SQL And Relational Data"Base"ics. Three-day seminar for managers, DP/MIS personnel. Call Relational Institute, (408) 268-8821.

26: MTLRUG quarterly meeting at Dorval Airport Hilton, Canada. For more information call Mich Kabay (514) 931-6187.

27: CINMUG meeting. For information call P.G. Landwehr (513) 621-2850.

27: 1989 Government Technology Conference, Eastern Region. Empire State Plaza, Albany, NY. Contact David Cawthorn, (518) 462-1780.

[OCTOBER]

19: INRUG bimonthly meeting at HP office in Carmel, IN. For information call Dave Largent (317) 284-4461.

[NOVEMBER]

13-17: Abacus Programming Corp. is offering a hands-on course in Expert Systems and Knowledge Engineering. Course fee $1,495. Contact Dr. Ronald Citrenbaum, (818) 795-8000.

[DECEMBER]

11-13: The Fifth Annual Access Technology 20/20 Users' Group at the Hynes Convention Center in Boston, MA. Call Karen Smith, Rosemary Walsh or Joanne Knowlton (508) 655-9191.

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